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This Week

Now that the Vanderbilt Cup race is over, there are a whole lot of hows and whys to be presented. On page 501 there is an analysis of the race while on page 514 there is a table showing just what happened to every entrant. This is incidental to a somewhat technical account of the race starting on the preceding page.

The Paris show is over, too. Read about those new European cars on page 510.

Buick and Dodge are both offering something different for the 1937 market. The descriptions of these new models are on pages 518 and 522 respectively.

There is some mighty interesting material on Diesel engines beginning on page 526.

Grease Makers Meet Technical Papers Read Before Lubricant Convention

The National Association of Lubricating Grease Manufacturers, at its fourth annual convention in Chicago this week, heard a number of papers on the various tests and research work which individual members and committees have been doing. Outside organizations which have been studying lubricating problems also had a part in the program.

H. R. Reynolds, of the Fafnir Bearing Co., chairman of the sub-committee on lubricants of the bearing engineers' committee, reported on the B.E.C. grease testing machine, and said: "We have been primarily interested in the separation point, regarding the melting point as a secondary characteristic." He said that greases which the committee had tested altered their consistencies at various temperatures, some breaking down after only 50 hours, others holding up after 500 hours. He urged that grease manufacturers con-

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Orders Piling Up

Dealers Press for Early Delivery of New Cars; New Production Records Likely Next Month

By Harold E. Gronseth

Automobile companies are again in the position of selling more cars than they are producing, with heavy banks of orders piling up at the factories, assuring the industry of an active fourth quarter. Indications are that production in November and December easily will go beyond that of corresponding months last year, setting new high marks for these months. Some of the plants with expanded facilities are expecting to test their new capacities next month. They are better equipped and better organized this year to step up output, as is already evident from their rapidly expanding operations.

It is a usual experience, and to be expected at the start of a model year, that orders will outrun production for a while. It is only the extent to which advance orders accumulate that is significant. Optimism prevails this year at all distributor and dealer meetings and the orders they are leaving behind exceed the expectations of the manufacturers. What makes this year differ from most others in the past is the exceptionally short carry-over of 1936 cars. So many dealers are completely sold out of the past year's models that constantly increasing pressure is being exerted on the factories for the new merchandise. Two companies, Buick and Dodge, have advanced their announcement dates and are introducing 1937 models over the week-end.

Pre-announcement activity is at high pitch as the factories prepare for the launching of their new sales campaigns. For weeks, factory executives have been engaged in a round of meetings with field representatives, distributors and leading dealers at the home office. Service supervisors and managers are flocking in to the factories for special training on the new models. From now until automobile show time, company officials and sales promotion crews will be touring the country, presenting the new lines and 1937 sales programs to

dealers out in the various territories.

Production of 1937 cars is now in full swing at nearly all plants. Chevrolet got under way a week ago and about half of the assembly branches are now turning out new models with the others about to start. The Ford assembly line at Dearborn is filling up and ready to go. Parts and sub-assemblies have been going forward to branches for some time so that the branches are in position to swing into line promptly after the main plant starts. Oldsmobile is slated to begin this week. That leaves only Pierce-Arrow and Willys-Overland to swing into line on 1937 production. The former is scheduled to start late this month and the latter on Nov. 5.

Bus Men Talk Safety

Annual Convention in Detroit Hears ICC Officials

Over 350 delegates attended the tenth annual meeting of the National Association of Motor Bus Operators held in Detroit Thursday and Friday, Oct. 15-16. The association, of which Arthur M. Hill, of Charleston, W. Va., is president, is comprised of the heads of private and municipal bus lines throughout the country. Delegates Thursday heard John L. Rogers, H. H. Kelly, H. M. Roberts and W. A. Hill, officials of the Bureau of Motor Carriers of the Interstate Commerce Commission. Friday's program included addresses by Marion M. Caskie and Joseph B. Eastman, of the I. C. C., and a tour of the General Motors truck plant at Pontiac.

Marcus Dow, of Cleveland, chairman of the safety committee of the association, in an interview with the press, advocated the same strict tests for applicants for automobile operator's licenses as are given applicants for jobs as drivers with the major bus companies, declaring the nation's traffic safety

(Turn to page 507, please)

Fisher Body Spends \$25,000,000

**Big Capital Expenditure Made to Retool Plants
for New "Unisteel" Bodies**

Expenditures in excess of \$25,000,000 are being necessitated by the introduction of the new "unisteel" turret top Fisher body that will feature the 1937 line of General Motors cars, it was disclosed today by Edward F. Fisher, general manager of the automotive concern's body-building division.

Dies for the new models are costing \$10,000,000. Installation of new machinery, building programs now underway at various plants and other investments in fixed assets account for another \$11,000,000, while the cost of the change-over to the new type of construction, principally the rearrangement of production lines and equipment, exceeds \$4,000,000.

Of the \$15,000,000 total represented by the last two items, \$4,150,000 is expended in Detroit, Flint, Pontiac and Lansing, Mich. More than \$1,300,000 likewise is finding its way into the plants at Cleveland and Norwood, Ohio, and \$631,000 into the Tarrytown and Buffalo, N. Y., factories.

Approximately \$2,260,000 is being spent in preparing other manufacturing units throughout the country for the part they will play in the production of the unisteel bodies. These include plants at St. Louis, Janesville, Wis.; Atlanta, Kansas City, Baltimore, Oakland, Cal., and Memphis. The remaining \$7,000,000 represents construction of the new stamping division plant at Grand Rapids, Mich.

Steel is employed for all structural purposes in the new bodies. The unisteel body is a single steel unit, as the name implies. The turret top is permanently fused to the front end assembly and the quarter panels, and those parts with the reinforced steel floor. To this rigid structure, the steel interior brac-

ing, which is welded at every point of contact, is added.

The steel rocker panels, roof rails, U-shaped cross members, vertical steel pillars, the bulkheads at front and back, coupled with the inherent strength of the modern streamlined design, offer greater resistance to torsional, beam and compression stresses than has ever before been achieved, Mr. Fisher declares.

Tractor Sales High In Spite Of Drought

In a talk before the forty-third annual convention of the Farm Equipment Institute held in Chicago last week, Harry G. Davis, director of the Institute's research and statistical department, revealed that despite the intense drought of last summer, sales of trac-

tors are showing considerable increases over other years. He said that the drought's effect on farmers would result in greatly decreased live stock, forcing many farmers to mechanize.

"Tractors," said Mr. Davis, "represent nearly half the total sales of mechanized equipment to farmers. This is attributable in part to the small one-plow units and to the fact that they are more efficient."

Budd Gets GMC Stamping Order

The Edward G. Budd Mfg. Co. this week announced receipt of an order from General Motors Truck Corp. for the major stampings for the G. M. C. Model T-18 standard and over-engine truck cab. The order will total almost half a million dollars.

Lincoln-Zephyr Prices

	1937 Prices	1936 Prices	Change
Three-passenger coupe	\$1,090		
Sedan (four doors)	1,190	\$1,320	-\$130
Coupe-sedan (two doors)	1,170	1,275	-105
Town Limousine	1,350	...	...

Lincoln Zephyr Steering Improved

**Transverse Stabilizer Now Standard; Engine Changes
Make for Quieter Operation**

In the description of the new Lincoln Zephyr in our Oct. 10 issue, mention was made of the fact that improvements had been made in the steering system, but no details were given. Information has since been supplied on this point and as well as a few others.

The new model has a steering wheel with bright steel spokes and a new horn button with the Lincoln Zephyr medallion in the center, a new front-axle center of heavier I-section, a different caster angle intended to make steering

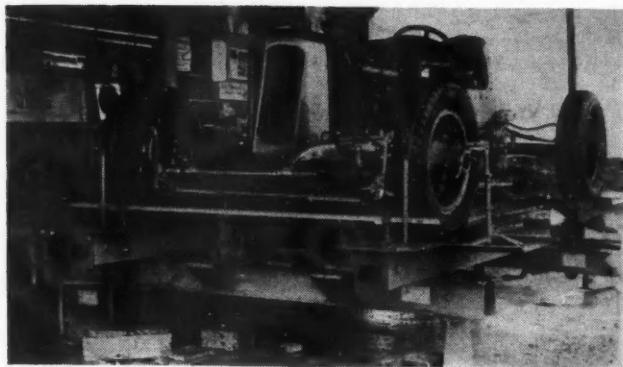
easier, a new steering gear with 20.2 instead of 18.4 ratio, and a redesigned steering gear housing which furnishes a better support for the gear-adjusting means. The transverse steering stabilizer, which has been used experimentally for some time, is now regular equipment. This holds the axle in definite relation to the body by a transverse radius rod paralleling the transverse drag link, and is particularly desirable on the new model on account of the softer, longer front springs and shackles that normally occupy a more nearly vertical position. There is a similar transverse stabilizer on the rear axle, and the two stabilizers together are said to improve materially the steadiness of the car in strong cross winds and on rough roads. Shackles are heavier and have larger pins.

The tilting-beam-headlight switch is now on the toe board and the light switch has been removed from the steering wheel to the dash. A boot has been added to the gear-shift-lever housing to prevent oil from creeping out and soiling the clothing of occupants. Horns are now secured to the under side of the hood for greater effectiveness.

Chassis springs are longer and have 14 and 15 leaves (front and rear respectively) which is one and two more than previously. Spring rates are 300 lb. per in. for the front and 250 lb. per in. for the rear, these corresponding to twice the figures for conventional springs, since transverse springs are used. Radius rods for the rear axle are secured to the brake backing plates



Clamped in an iron frame, the outer sheathing of the new "Unisteel" turret top body by Fisher is welded into one unit. Here one of the workmen is shown fusing the top to the rear quarter panel with an acetylene torch.



Ambler Special,
driven by Gus
Zarka at the
Roosevelt Race-
way being
checked for wheel
alignment
on Bear equipment

and add to the stiffness of the axle tube. All shock absorbers are adjustable and the rear ones are mounted under the frame for better accessibility. There is a chain on the radiator filler cap to prevent it from dropping into the engine compartment.

Engine changes include a quieter camshaft, internal ribs bridging cylinder-head bosses (for more silent valve action), and a quieter fan with alternate long and short, over-shaped, pointed blades, similar to those of airplane propellers. Bosses for the front supports of the powerplant have been added to the engine block to eliminate unnecessary parts.

Among the less noticeable body changes are a heavier rear-view-mirror bracket, a new combination rear-deck hinge and check, new scuff plates which provide a better seal for the door bottoms and heavier rear-quarter window frames.

Polish Firm Licensed To Make General Tires

Contracts just signed by the General Tire and Rubber Co., of Akron, and the management of Stomil, S. A., the only automobile tire manufacturing concern in Poland, provide that hereafter tires will be manufactured in Poland under the supervision and according to the specifications of General Tire engineers, it was announced today by William O'Neil, president of the General Tire and Rubber Co.

A corps of General Tire engineers will leave Akron late in October for Poznan, Poland, where the Stomil plant is located and will remain for an indefinite period. Part of the General Tire engineering staff will be transferred to Poland permanently, it was announced.

The Stomil plant has been in operation about 11 years and is now producing approximately 300 tires a day, according to Joseph Andreoli, vice-president and general manager of the General Tire and Rubber Export Co. It is now headed by Dr. Jan Piotrowski. It is the principal source of supply for tires for the Polish Army and the Polish Government and its production of bicycle tires is large. Present plans provide that the output of General-built tires in the Stomil plant shall be limited to the trade in Poland alone.

cially equipped for running on snow. In order to facilitate foreign entries in these contests, custom regulations will be eased and special rates made for railway transportation in Italy. Further details concerning these facilities, as well as the official rules and regulations for the contests, will be supplied on request by the technical office of the Royal Automobile Club of Italy, Rome.

Pontiac Again Wins Top Honors for Direct Mail

For the second successive year Pontiac Motor Co.'s direct mail campaign has been awarded highest honors for "the best direct mail campaign of the year in the automobile industry."

The award, which is one of 50 in as many different business classifications, was presented by J. S. Roberts, president of the Direct Mail Advertising Association, to S. C. Bray, sales promotion manager of Pontiac, during the annual convention of the association in Cincinnati early this month.

Snow-Plow, Anti-Skid Device Contest to Be Held in Italy

The second international competition for snow-plows will be held in the Italian Alps next February, according to an announcement by the Royal Automobile Club of Italy. At the same time and place, there will be another competition for anti-skid devices to be used on snow or ice, and for vehicles spe-

Post Mortem on Columbus Day Race

Metropolitan Section, SAE, Hears Conflicting Views on Why Europeans Won

By H. E. Blank, Jr.

Two hundred and fifty members and guests of the Metropolitan Section, S.A.E., were on hand for a discussion Oct. 13 of what happened behind the scenes at the George Vanderbilt Cup contest at Roosevelt Raceway, Westbury, L. I.

Harold F. Blanchard, chairman of the A.A.A. Raceway Technical Committee, introduced Lee Oldfield, vice-chairman. Mr. Oldfield observed dryly at the outset of his talk, that it was quite apparent to those who watched the 300 mi. grind that Americans are not the only people in the world who can drive cars. Discussing the winning cars, he said that he had noticed nothing peculiar about their engines with the only exception that the valves were seated directly in the aluminum head. In concluding his speech he expressed the opinion, shared by most of the speakers who followed, that anyone familiar with the American cars were

surprised at the relatively good showing they made.

Sid. G. Tilden, another member of the raceway technical committee, discussed the braking problems encountered in checking cars previous to the race. He pointed out that the Americans had adapted regular production brakes to their cars and, without benefit of technical advice and minus essential funds, their brakes couldn't compare with those on the winning Alfa Romeo jobs. Most of the American cars had hydraulic brakes and in most cases two master cylinders were employed, one for front and the other for the rear brakes. Tilden pointed out the amusing fact that several drivers believed that larger master cylinders and more of them would correspondingly increase braking efficiencies. According to Tilden, after adjustments to these care were made by the technical committee, retarding forces of at least 70

Halley Bugatti
Special being
checked on Ben-
dix - Feragen
frame straighten-
ing equipment at
the Roosevelt
Raceway



per cent were secured for the American cars.

Contrary to the general impression that foreign entrants had a pre-race advantage with their experience in road racing, W. F. Bradley, Paris correspondent of AUTOMOTIVE INDUSTRIES, expressed the opinion that the new raceway is unlike any course in Europe and does not provide a real test for gears and brakes. To substantiate his statement he named three European courses, one in Sicily, another at Monthléry and a third, the Nürburg Ring, where he estimated that—with the same field—at least 50 per cent of the cars would have been unable to finish. At the raceway on Oct. 12, 10 out of 12 of the foreign entries finished the race. In conclusion he voiced the hope that the Americans would show more interest in the development of an international formula for racing car specifications.

Citing the need for joint action to assist American drivers to become formidable contenders in future international competitions, Frank B. Willis, Bendix Products Corp., proposed the formation of a society which would raise the necessary funds and stimulate interest in the design of racing cars. Mr. Willis's idea called for the building of 12 of these cars which would be used by drivers representing the U. S.

Fuel requirements for this race were entirely different from any heretofore encountered, said Fred R. Speed, Ethyl Gasoline Corp. He revealed that the foreign-built cars used high-alcohol benzol blends, some of these blends having gasoline content as low as 5 per cent. Fuel employed by the American cars had gasoline content ranging from 80 per cent down to 65 per cent, the remainder being benzol.

Other talks presented at this interesting session were made by: A. E. Feragen, Bendix Corp.; C. A. McCune, Magnaflux Corp.; Peter DePaolo, Phil (Red) Schafer, both of whom are well

known constituents of the racing fraternity.

Also present at the meeting were several of the drivers who participated in the Vanderbilt event, the two English drivers, Brian Lewis and Pat Fairfield; and Al Putnam, Los Angeles.

Buick Prices for 1937

Series 40 Special

		1937	1936	Ch'ge
46	Business Coupe	\$765	\$765	\$...
44	2-Door Sedan with large luggage compartment	810	835	-25
46S	Sport Coupe	825	820	+5
48	2-Door Touring Sedan	835	835	...
47	4-Door Sedan with large luggage compartment	845	885	-40
41	4-Door Touring Sedan	870	885	-15
46C	Convertible Coupe	905	905	...
40C	Convertible Phaeton ..	1145	...	...

Series 60 Century

64	2-Door Sedan with large luggage compartment	1000	1055	-55
66S	Sport Coupe	1015	1035	-20
68	2-Door Touring Sedan	1025	1055	-30
67	4-Door Sedan with large luggage compartment	1035	1090	-55
61	4-Door Touring Sedan	1060	1090	-30
66C	Convertible Coupe	1095	1135	-40
60C	Convertible Phaeton ..	1345	...	...

Series 80 Roadmaster

81	4-Door Sedan	1275	1255	+20
81F	Formal Sedan	1395	...	...
80C	Convertible Phaeton ..	1565	1565	...

Series 90 Limited

91	6-passenger Sedan	1725	1695	+30
90	8-passenger Sedan	1895	1845	+50
91F	Formal Sedan	1895	1895	...
90L	Limousine	1995	1945	+50

Thomas and Ford to Speak at SAE Dinner

Dr. James S. Thomas, president of the Thomas S. Clarkson Memorial College of Technology, Potsdam, N. Y., will be the chief speaker at the SAE annual dinner, to be held at the Hotel Commodore in New York Nov. 12 at 6:30 p. m. Dr. Thomas will speak on "What the Machine Has Done for Mankind."

From the New York Automobile Show, Alfred Reeves, vice-president of the AMA and show manager, will introduce "Senator" Ford, who is already well known to SAE members.

Alex Taub, GM Engineer, Transferred to Vauxhall

Alex Taub, widely known for the last 10 years as engineer in charge of power plant development for Chevrolet Motor Co., has been transferred to the General Motors staff and assigned new duties with Vauxhall Motor Co., Ltd., Luton Beds, England. He is sailing for England Nov. 4.

Mr. Taub has had a colorful career in the automotive field, having been with G.M. for 20 years, the last 10 years of which he was with Chevrolet in charge of engine development. He was concerned with the design of the first six-cylinder Chevrolet engine and



Alex Taub

G. M. Engineer recently transferred to Vauxhall Motors, England

terminates his activity with the development of the 1937 power plant.

Mr. Taub is a past-chairman of Detroit Section SAE, and at present is serving a term on the SAE Council. Engineers throughout the industry know Mr. Taub as the author of many important papers on engine design, his most outstanding contribution to the literature being an SAE project some years ago correlating existing knowledge on combustion chamber design.

His duties at Vauxhall will be concerned with the design and development of all power plant units for the British G.M. line, supervision extending to the experimental machine shops and liaison with suppliers.



O. T. "POP" KREUSSER, for the past five years director of the Museum of Science and Industry, Chicago, has been appointed assistant director of General Motors Research. For the seven years prior to his association with the museum, Mr. Kreusser was in charge of the General Motors proving grounds at Milford, Mich.

JOHN TJAARDA, chief engineer of the Briggs Manufacturing Co., Detroit, sailed for Europe on the Normandie Oct. 14 to attend the foreign automobile shows.

H. M. RUGG, automotive engineer for the Pennsylvania Grade Crude Oil Association, has been assigned to the Detroit territory and will be in charge of the association's new offices in the General Motors Building.

B. J. HASKINS has resigned his position as vice-president in charge of engineering of Joseph Weidenhoff, Inc., after having been with the company for the past 15 years.

T. A. BOYD, of the General Motors Research Laboratories, Detroit, has been elected chairman of the division of industrial and engineering chemistry of the American Chemical Society. Mr. Boyd, co-discoverer with Thomas Midgley, of the use of tetraethyl lead in gasoline, will direct arrangements for the third national symposium on chemical engineering in New York, Dec. 28-29.

W. E. ENGLAND, one time chief engineer of the F. B. Stearns Co. and a former chairman of the Cleveland Section of the S.A.E., has resigned as chief engineer of the Ohio Rubber Co., Willoughby, O.

DOUGLAS STERLING WALLACE, for several years with General Motors car divisions, has been appointed retail sales manager of Pontiac's Detroit retail store.

BENJAMIN D. SIMPSON, a former Pontiac employee, has returned to the Pontiac retail store in Detroit as used car manager.

WALTER J. BEMB, president of Bemb Robinson Co. of Detroit, is retiring from the retail field in which he has operated for the past 34 years. Mr. Bemb now plans to become a manufacturers' agent representing several standard lines.

:SLANTS:

LOUDEST SPEAKER — Above the roar of the racing cars on Roosevelt Raceways the voice of the world's most powerful public address system rose to carry announcements to the thousands of spectators. The problem of building this speaker was solved by engineers of the Western Electric Co. after making tests with sound meters and plotting sound contours on a map of the course. To avoid scrambled speech and interference, all sound sources were concentrated at a single point. The resulting installation was like the voice of a giant coming from the 100-ft. tower where the 19 super-power sound projectors were installed.

RECOIL PROPULSION — A study of propulsion of motor vehicles, airplanes and boats by means of centrifugally-ejected air or water is being made by a French engineer at Nantes, according to a report to the Department of Commerce. One of the inventor's models, a three-wheeled vehicle equipped with a 9 hp. gasoline engine not connected with the wheels, has reached a speed of 50 m.p.h., it is claimed. Centrifugal ejection is 50 per cent more efficient than propulsion by a propeller, he asserts.

GRADE CROSSINGS — Elimination of grade crossing hazards has been going on at an unprecedented rate due to the allocation last year of \$200,000,000 of emergency relief funds for the purpose, according to the Bureau of Public Roads, U. S. Department of Agriculture. With these funds alone, 2097 existing grade crossings will be eliminated, 320 old grade-separating bridges will be rebuilt and 1037 crossings will be protected by the installation of safety gates, flashing signals or other warning and safety devices.

"H" SHAPED ENGINE — An unorthodox "H" shaped engine, the Rapier Series V, has received a certificate of type approval from the British Air Ministry following completion of official tests. The engine, rated to deliver 315 hp. at 10,000 ft. with a maximum output of 340 hp. at 13,000 ft., has been designed to reduce head resistance normally encountered by air-cooled engines. Net weight of this 16-cylinder air-cooled engine is 720 lb. It has been selected to power the upper component of the Mayo composite aircraft which is to be launched in mid-

air from a flying boat, according to reports of the Department of Commerce.

PONTIAC BROADCAST — Kathryn Cravens began this week a series of 15-minute news broadcasts for Pontiac, known as "News Through a Woman's Eyes." Over a coast-to-coast Columbia network of 57 stations, the feature will be heard from 2 to 2:15 p.m. each Monday, Wednesday and Friday.

Mrs. Margaret Fisher

Mrs. Margaret Thesian Fisher, mother of the seven Fisher brothers, died last Tuesday in Detroit after a week's illness. Her sons were all with her at the time of her death.

Mrs. Fisher was born in Sandusky, Ohio, 79 years ago, where she married Lawrence Fisher, son of a Peru, Ohio, blacksmith. They moved to Norwalk where the sons learned wagon making, their father's business. The sons later moved to Detroit where they engaged in the growing automobile business. After the death of her husband, Mrs. Fisher went to live in Detroit. Besides her sons, Mrs. Fisher leaves three daughters.

Funeral services were held in Detroit Friday and another service was held in Norwalk on Saturday, where burial took place.

Hudson Increases Discounts To Dealers and Distributors

Increased discounts for distributors and dealers were placed in effect Oct. 1 by Hudson Motor Car Co., according to W. R. Tracy, vice-president in charge of sales. Under the new plan, distributors and dealers will be able to earn as much as \$28.50 additional



R. E. Stone

who has been appointed vice-president in charge of manufacturing of Graham-Paige Motors Corp.

net profit on some models in the Hudson line, Mr. Tracy pointed out. The base discount is the one that was in effect, and the new sliding scale discounts are retroactive and will progress upward from this base in units of one-half of 1 per cent as sales volume increases.

"The sliding scale has been so arranged that dealers of all sizes—both small and large retailers—can participate in this extra profit opportunity," Mr. Tracy said.

August Retail Financing Up 36%

New Cars Account for \$94,017,673,
and Used Cars \$52,123,841

The dollar volume of retail financing for August of this year amounted to \$147,002,587, a decrease of 16.6 per cent from the preceding month, but an increase of 36.1 per cent compared with the same month of 1935. Number of new cars financed was 160,083, giving an average per car of \$587, a new high.

Wholesale financing in August, 1936,

amounted to \$129,865,102 which is 35.9 per cent higher than August, 1935.

These figures are based on the summary compiled by the Bureau of the Census, Department of Commerce, from data supplied by 456 identical reporting organizations.

The accompanying table gives further details on automobile financing.

Wholesale Financing Volume in Dollars	RETAIL FINANCING													
	TOTAL			NEW CARS			USED CARS			UNCLASSIFIED				
	Number of Cars	Total Amount	Per Car											
August 1936.....	\$129,865,102	2,367,024	54.1	160,083	94,017,673	587	204,613	52,123,841	255	2,328	861,073	370		
July 1936.....	166,018,288	436,223	2.4	176,201	982	404	200,903	116,065,087	576	232,899	910,132	376		
August 1935.....	95,588,937	232,614	1.0	106,472	612	364	116,967	65,138,973	557	172,445	59,226,773	254		
8 Months 1936....	1,251,664,152	3,044,189	1,219,481	553	401	1,378,243	792,880,439	576	1,649,212	40,244,973	233	3,172	1,068,668	343
8 Months, 1935....	892,125,905	2,170,381	798,059	553	368	916,074	500,396,396	546	1,210,933	419,981,282	255	18,734	6,640,132	354
										205,891,138	235	35,374	12,772,029	361

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES

Business in almost all its branches continues to show encouraging trends. Wholesale as well as retail trade is reported to be substantially larger than a year ago. Activity in the heavy industries is also well maintained, except where seasonal factors have resulted in temporary curtailment of operations.

Carloadings Hold Upward Trend

The general tendency is reflected in the movement of railway freight, which continues to show material gains above the figures for last year. During the week ended Oct. 3, loadings totaled 819,126 cars, showing an increase of 12,056 cars, or 1.5 per cent, above the total for the preceding week and a rise of 113,152 cars, or 16 per cent, above that a year ago.

Lumber Business Good

Lumber production during the week ended Sept. 26 was 68 per cent of the 1929 weekly average, and shipments were at 71 per cent of the 1929 level. Reported new business was 0.2 per cent, and shipments 6 per cent above output.

Crude Production Steady

Average daily crude oil production for the week ended Oct. 3 amounted to 2,987,800 bbl., as against 3,030,050 bbl. a week earlier and 2,719,600 bbl. a year ago. Total output permitted under the restrictions imposed by the oil-producing states for September is calculated at 2,864,000 bbl.

Power Output Up 16%

A similarly favorable comparison is shown by electric power output, which

in the week ended Oct. 3 reached the second highest total reported so far this year and exceeded the figure for the corresponding period a year ago by 16.4 per cent. This gain compares with one of 16.1 per cent reported a week ago, 17.2 per cent two weeks ago, and 15.3 per cent three weeks ago.

Big Gains for Soft Coal

Bituminous coal production last month, according to the preliminary estimate, totaled 36,772,000 net tons, as against 33,240,000 tons in August and 25,038,000 tons in September, 1935. Anthracite output amounted to 3,818,000 net tons, as compared with 3,223,000 tons in August and 4,172,000 tons a year ago.

Fisher's Index

Professor Fisher's index of wholesale commodity prices for last week stands at 83.8 per cent of the 1926 average, as against 84 a week before, 84 two weeks before, 84.1 three weeks before, and 84.2 four weeks before.

Federal Reserve Statement

Unsettled conditions abroad are reflected in the statement of the Federal Reserve banks for the week ended Oct. 7, which shows an increase of \$126,000,000 in the monetary gold stock and a gain of \$122,000,000 in member bank reserve balances. Money in circulation rose \$39,000,000, while Treasury cash and deposits with the Federal Reserve banks declined \$75,000,000. Only minor changes occurred in Reserve bank credit outstanding, including a decline of \$1,000,000 in bills discounted.

N. Y. Show Exhibitors

Final List Includes Many Tourist Trailer Firms

The list of tourist trailer manufacturers exhibiting at the National Automobile Show, Grand Central Palace, New York, now includes 18 companies, as well as two makers of baggage trailers. One passenger car manufacturer, Hupp Motor Car Co., has withdrawn from the show as it does not expect to have new models available in time.

The complete list of exhibitors, with the space locations, follows:

National Automobile Show Exhibitors

Passenger Cars	Space No.
Auburn Automobile Co., Auburn, Ind.	B-4
Buick Motor Co., Flint, Mich.	A-2
Cadillac Motor Car Co., Detroit	A-13 B-1
Chevrolet Motor Co., Detroit	A-6 B-5
Chrysler Corp., Detroit	A-5 B-6
DeSoto Corp., Detroit	A-9
Dodge Brothers Corp., Detroit	A-7
Duesenberg, Inc., Indianapolis	B-3
Graham-Paige Motors Corp., Detroit	A-14
Hudson Motor Car Co., Detroit	A-12 B-10

Hayes Body Corp., Grand Rapids, Mich.	D-33-34-49-50
Kabin Koach Co., 21813 Gratiot Ave., E. Detroit, Mich.	D-91-92-97-98
Kozy Coach Co., 240 E. Kalamazoo Ave., Kalamazoo, Mich.	D-67-68-69-70
Mullins Manufacturing Corp., Salem, Ohio	D-35-36-37-46-47-48
LaFayette Nash Motors Co., Kenosha, Wis.	D-82-83-106-107
Palace Travel Coach Corp., 4521 N. Saginaw St., Flint, Mich.	D-64-65-66-71-72-73
Pierce-Arrow Motor Corp., Buffalo, N. Y.	D-30-31-32-51-52-53-54
Quaker Trailer Co., Devon, Pa.	D-108 & 133
Sa'es Products Corp., Carlstadt, N. J. (Travel Trailer)	D-113 & 128
Schult Trailers, Inc., 1800 S. Main St., Elkhart, Ind.	D-56-57-58
Silver Dome, Inc., 50 Endicott St., Detroit	D-89-90-99-100
Split Coach Motor Corp., Broad & Walnut Sts., York, Pa.	D-62-63-74-75
Tralette Division, Peninsular Metal Products Co., Union Guardian Bldg., Detroit	D-86-87-102-103
Vagabond Coach Mfg. Co., New Hudson, Mich.	D-84-85-104-105

Accessories

Abeles-Lewit Co., Inc., 161 W. 64th St., New York	D-41
Alemite Corp., 1826 Diversey Parkway, Chicago	C-15
American Gas Machine Co., Inc., 360 Furman St., Brooklyn, N. Y.	D-7
Aro Equipment Corp., Bryan, O.	C-36-37-38
Bear Manufacturing Co., Rock Island, Ill.	D-41
Bendix Aviation Corp., 401 Bendix Drive, South Bend, Ind.	C-17
Bendix Products Corp., South Bend, Ind.	D-55B
Buda Company, Harvey, Ill.	C-13-14
Burgess Battery Co., 202 E. 44th St., New York	C-35
Carpenter, L. E., & Co., 444 Frelinghuysen Ave., Newark, N. J.	D-11
Caterpillar Tractor Co., Peoria, Ill.	C-1
Chase, L. C., & Co., Inc., 295 Fifth Ave., N. Y.	C-64-65
Chilton Co., Chestnut & 56th Sts., Philadelphia	D-42
ClerSite Co., 24 Water St., New York	C-45
Coleman Lamp & Stove Co., 401 N. Broad St., Philadelphia	D-28

(Turn to page 528, please)

40 Years Ago

with the ancestors of AUTOMOTIVE INDUSTRIES

Foreign Notes

A firm in Paris is about to manufacture acetylene lamps for motor carriages.

De Dion and Bouton are about to place on the market a new petroleum motor which is said to combine all the necessary qualities.

H. J. Lawson, the "motor vehicle king," intends to organize a motor race from London to Brighton and return for prizes amounting to \$10,000.

A depot has been established in London where motor vehicles may be repaired and stored. Skilled mechanics, thoroughly posted in motor vehicle work, will be kept in readiness to answer calls from disabled vehicles in any part of the city.

The house of Roger, now become the Anglo-French Motor Carriage Co., refused to take part in the Paris-Marseilles race on the ground that the conditions were not normal and that they were aiming at economy, simplicity and ease of control rather than excessive speed.

—From *The Horseless Age*, Oct., 1896.

American Bantam Stresses Economy

Operating Cost of $\frac{3}{4}$ Cent per Mile Claimed; Engine Has 45.6 Cu. In. Displacement

Specifications of the new American Bantam car, successor to the Austin, have just been made public. It is claimed for this car that it will run 45-50 mi. per gal., 30,000 to 40,000 mi. on a set of tires, at a cost of less than ¼ cent per mi. for fuel, oil and tires, and is capable of top speeds in excess of 60 m.p.h. The Bantam will be available in three commercial and four passenger-car models. Body space is naturally an important feature of any "baby" car and what the new model offers in this respect may be seen from the drawing of body dimensions reproduced herewith.

The three commercial models listed are a panel truck at \$395, a pick-up truck at \$385 and a business coupe at \$335. The passenger models include a deluxe coupe at \$385, a roadster at \$385, a standard coupe at \$365, and a custom roadster at \$445.

The four-cylinder engine has a bore of 2.2 in. and a stroke of 3 in. (45.6 cu. in.) and is rated 20 hp. at 4000 r.p.m. A cylinder block of alloy cast iron is set on an aluminum, barrel-type crankcase. The crankcase is fully counterweighted and of two-bearing design. Main bearings are $\frac{1}{2}$ in. in diameter, connecting-rod bearing, $1\frac{1}{2}$ in. Main bearings are $\frac{1}{2}$ in. and $1\frac{1}{2}$ in. long (front and rear respectively), connecting-rod bearings, $1\frac{1}{4}$ in. Pistons are of cast nickel steel, with three compression rings and one oil ring. Piston pins are of nitralloy and float, being held in a central position by aluminum buttons. Connecting rods are nickel-steel drop forgings. Inlet valves are of chrome-nickel steel, exhaust valves of silicon-chromium steel. A cast cam-shaft is used.

Cooling is by thermo-siphon action and the cooling system has a capacity of 6 qts. Ignition is by the usual coil and battery system with automatic spark advance. The oil sump has a capacity of 1 gal. Oil is fed under pressure to all main connecting-rod and camshaft bearings. A 5-gal. fuel tank is located at the rear and fuel is supplied to the carburetor by an A.C. fuel pump. Electrical equipment is Autolite. The generator is driven through a Vee belt, while the starter has a Bendix drive.

Power is transmitted through a single-plate dry clutch and a three-speed gear unit having synchronizing clutches for the intermediate and high speeds. The front axle is of the usual I-beam type and is held in position by a torque member taking the brake torque, while the rear axle is of the semi-floating type. Torque-tube drive is used. The pressed-steel frame is supported at the front by a transverse spring and at the rear by two cantilever springs. Chassis lubrication is by the Alemite system.

Steering is through a worm-and-sector gear fitted with anti-friction bearings. Wheels are of the spoked pressed-steel type and are equipped with 4.75-16 in. tires. Larger wheels giving greater road clearance are optional. Shock absorbers are of the friction disc type. Service brakes are of the four-wheel internal type and are applied by cables.

The American Bantam has a tread of 46 in., an overall length of 120 in., an overall height of 60 in., and a ground clearance of 8 in. With coupe body it weighs 1200 lb.

Foundrymen's Convention in Milwaukee Beginning May 2

Milwaukee, one of the foremost foundry centers in the United States, has been selected for the 41st Annual Convention and Exposition of the American Foundrymen's Association, to be held during the week of May 2, 1937. The meetings and display of equipment and supplies will be staged in the Milwaukee Auditorium.

The board of directors, in selecting Milwaukee for the 1937 gathering of the foundry industry, gave recognition to the progressive Milwaukee chapter. Outstanding plants, making all classes of castings, will be available for inspection.

Shaping the program and exhibition to meet the present day needs of the industry, special attention will be given to new technical and mechanical developments. Papers on all phases of foundry practice and on management problems will be offered, with special attention being given to the medical and legislative aspects of safety and hygiene in the foundry. In addition, papers have been scheduled on the use of safety shoes, leggings, goggles and respiratory protective devices and on



Elmer McCormick
chief engineer of the John Deere Tractor Co., who was recently nominated vice-president of the S. A. E. representing the tractor and industrial power equipment activity.

maintenance of equipment. This part of the problem of foundry management today, will be found supplemented by a special section in the exhibition devoted to protective equipment.

Graham to Meet European Distributors in London

Robert C. Graham, executive vice-president of the Graham-Paige Motors Corp., sailed last week to attend a meeting of Graham European distributors to be held in London during the Olympia automobile show. Following the distributors' meeting, Mr. Graham will make an extended tour of Europe to study at first hand business conditions and export sales potentials for 1937.

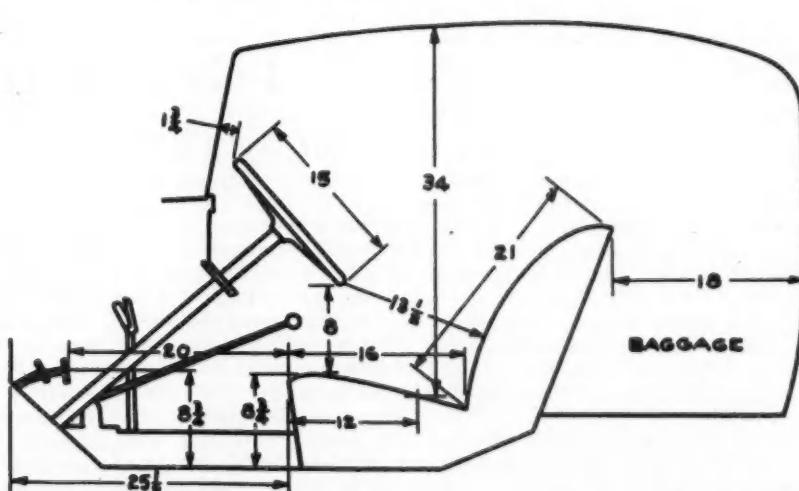


Diagram showing interior dimensions of the American Bantam.

Grease Makers Meet

(Continued from page 499)

sider the job for which the lubricant is to be used.

J. O. Almen, head of the dynamics section of General Motors Research Laboratories, offered a particularly interesting paper or tests which have been made in the automotive field. Mr. Almen's paper was illustrated with photographs showing the results of tests made on bearings and other parts of motor cars under both normal and unusual conditions.

Other speakers before the convention were C. R. Gillette, who gave a demonstration of the B.E.C. mechanical stability testing machine; C. R. Ahlberg, who gave a demonstration on the B.E.C. penetrometer and melting-point apparatus; R. C. Walter, Penola, Inc., of Pittsburgh, who read a paper on "Steel Mill Lubrication"; L. M. Sheely, Armour & Co., Chicago, on "Fatty Acids"; C. L. Larson, Sinclair Refining Co., New York City, who talked on "The Pros and Cons of E.P. Lubricants"; D. A. Hunter, of D. S. Hunter & Associates of Cleveland, who spoke on the Robinson-Patman bill; F. W. Lovejoy, Socony-Vacuum Oil Co., New York City, who talked on "The Fallacy of Wish-Thinking in Merchandising"; Thomas J. O'Kane, Rogers, Gano & Gibbons, Inc., of Chicago, who spoke on "Public Indifference—A Challenge"; Dr. A. W. Ralston, Armour & Co., who spoke on "Fatty Acid Derivatives"; and H. A. McConville, General Electric Co., Schenectady, N. Y., whose paper was on "Acceleration Oxidation and Other Recent Developments in Testing Lubricating Greases."

Homer F. Wilhelm, of the Socony-Vacuum Oil Co., New York, was elected president of the association.

National Metal Congress In Cleveland Next Week

The Eighteenth National Metal Congress opens in Cleveland next Monday, with metallurgists, research men, plant superintendents, engineers and executives from all parts of the U. S. and many foreign countries in attendance. Exhibits of the latest equipment and products will be shown, and nearly 150 technical papers will be read.

Among the papers having special interest for automotive engineers are the following to be given at the American Society for Metals sessions:

Physical Properties of Axle Shafts, by H. B. Knowlton, International Harvester Co.

Investigation of Fatigue Strength of Axles, Press Fits, Surface Rolling, and Effect of Size, by T. V. Buckwalter and O. J. Horger, Timken Roller Bearing Co.

Endurance of Gear Steel at 250 Degrees Fahr., by A. L. Boegehold, General Motors Corp.

Some Factors Affecting the Plastic

Deformation of Sheet and Strip Steel and Their Relation to the Deep Drawing Properties, by Joseph Winlock and R. W. E. Leiter, Edward G. Budd Mfg. Co.

Cold Working of Hollow Cylinders by Auto-Frettage, by N. E. Woldman, Eclipse Aviation Co.

Tire Trade Practice Rules Issued by FTC

Trade practice rules for the rubber tire industry were promulgated Oct. 17 by the Federal Trade Commission under its trade practice procedure. Proposed rules had been submitted by the industry at a general conference held in Chicago, June 4 last.

Except for minor amendments, the rules are the same as the tentative code put into effect Aug. 3, and described in AUTOMOTIVE INDUSTRIES of Aug. 8.

Zephyr on Exhibition

Burlington's 12-Car Diesel Train To Cut Chicago-Denver Time

With more than 200 Philadelphia business and professional men aboard, the longest streamlined train in the world pulled out of Broad Street Station at 9:15 a. m., Oct. 15, for the New York exhibition trip.

This new lightweight, stainless-steel Denver Zephyr of the Burlington Railroad, just completed by the Edward G. Budd Mfg. Co., consists of 12 cars, including Pullman sleepers, cocktail lounge, diner, observation-parlor car, coaches, mail and baggage car, and two Diesel power cars with a total of 3000 hp. The train made the New York run behind an electric locomotive of the Pennsylvania Railroad.

Short talks, broadcast over the master radio system to all passengers on the train, were given by A. Cotsworth, Jr., passenger traffic manager of the Burlington Railroad; Col. E. J. W. Ragsdale, chief engineer of the Budd Mfg. Co.; John F. Harbeson, partner of Paul Cret, and Edward G.

Budd, president of the Budd Mfg. Co. A representative of AUTOMOTIVE INDUSTRIES also was aboard the new train.

Efforts to break the record of 13 hours 5 minutes for the railroad running time between Chicago and Denver are to be made next Friday when the Burlington railroad's new 12-car Zephyr train makes its initial run. The old mark was set on May 26, 1934, at the opening of the World's Fair. The run at that time was made without passengers and with a three-car train.

The new Zephyrs will inaugurate a daily run between the two termini of the Burlington road. The running time will be 12½ hours for the test run, with 13½ hours for the standard run.

The powerplants of the two trains will each consist of two power cars equipped with two 900 hp. Diesels and one 1200 hp. Diesel. The motors were made in the shops of the Electro-Motive Corp. plant at LaGrange, a subsidiary of General Motors Corp. The trains will be 885 ft. in length, compared with the 200 ft. length of the present trains.

There are several departures from conventional train service in the new trains. They are equipped with 110 volt A. C. outlets permitting use of home radios, have phone service and are two inches wider than standard Pullmans.



B. C. Ames Co., Waltham, Mass., have announced a new catalog of their micrometer dial gages.*

Bulletin No. 6-G, just brought out by the South Bend Lathe Works, South Bend, Ind., describes the application of their 9 in. lathe to auto service and electric shop jobs.*

A circular describing the Federal low-friction indicator has been published recently by Federal Products Corp., Providence, R. I.

Just off the press is a bulletin entitled "The Properties and Applications of Heat Treated Wrought Nickel Alloy Steels." It was prepared by the International Nickel Co., Inc., N. Y.*

*Available through AUTOMOTIVE INDUSTRIES.

Labor Peace Efforts Futile

AFL and CIO Negotiations Fail to Bring Reconciliation; Further Attempts Unlikely Before Election

Peace between the Committee for Industrial Organization and the American Federation of Labor does not appear to be an early prospect. This becomes increasingly clear at each of the separate meetings of the C.I.O. and the executive council of the Federation. There is a common belief that discussion of peace at this time is a mere gesture. Moreover, it is the view that if the executive council and the C.I.O. finally decide on a joint meeting to discuss peace it will not be held until after the

Presidential election. This is based on the belief that the bulk of the organized labor vote will be cast for Mr. Roosevelt and the fear that if a meeting took place before the election it might develop a further breach between the C.I.O. and the Federation and thus split the vote.

John L. Lewis, chairman of the C.I.O. has again restated his determination not to undertake negotiation of peace terms with the Federation until the executive council rescinded its or-

der suspending the C.I.O. and its 10 rebel unions. While President William Green of the Federation and head of the executive council has indicated a willingness to discuss peace terms, he has also indicated the council's determination not to revoke the order in advance, if at all. Thus a stalemate exists.

The suggested peace was discussed Wednesday in Washington at meetings of both the C.I.O. and the council. Present at the C.I.O. meeting, which preceded that of the council was Max Zaritsky, president of the Amalgamated Hatters and Millinery Workers' Union who recently approached Mr. Green with peace terms. The Zaritsky proposal called for suspension of the council's ouster order and the appointment of a sub-committee by each the C.I.O. and the council. Mr. Green has indicated he was ready to select the council sub-committee but the C.I.O., through Mr. Lewis, said they would not name such a sub-committee until the order has been rescinded. Zaritsky acted as a liaison between the C.I.O. and the council at the latter's meeting but could only report back to the C.I.O. the previously declared position of the council.

Bus Men Talk Safety

(Continued from page 499)

problem would then be well on the way to solution.

"As it is now," said Mr. Dow, "any man who can turn an automobile around can get a license to operate a four-wheel locomotive on the public highways. Automobile manufacturers are making cars safer every year, but drivers are not keeping up. We must take each driver and drill into him the specific things he must do and the specific things he must avoid in order to make the streets safe."

"Furthermore, we must set up such high standards for licensed drivers that the dangerous and unfit candidates will not qualify. The drivers' license laws in most states are inadequate. In some states, there is not even provision for the revocation of the licenses of dangerous drivers."

Reckless Drivers Governed

Six automobile drivers convicted of motor-vehicle code offenses in New York State have been notified by Commissioner Charles A. Harnett that the installation of governors limiting their car speed to 25 m.p.h. will be a necessary condition to their receiving "restricted" licenses.

As we went to press no statement was available from Commissioner Harnett, but it is understood that the New York Code gives the motor-vehicle commissioner discretionary power to issue impaired licenses, and that it is this power which is being extended to include the installation of governors on the cars of convicted reckless drivers.

Trucking Associations to Meet in Chicago Next Week

Problems confronting the trucking industry from the standpoint of operations under jurisdiction and supervision of the Interstate Commerce Commission are to be discussed in Chicago next week when the American Trucking Associations, Inc., hold their third annual convention at the Stevens Hotel. More than 2000 operators embracing every phase of the trucking field are expected to attend the sessions.

Among the speakers who will address the sessions are: William E. Lee, Bureau of Motor Carriers of the I. C. C.; H. H. Kelly, chief of the safety section of the Bureau of Motor Carriers of the I.C.C.; Baird H. Markham, director, American Petroleum Industries, committee; William H. Day, chairman, executive committee, National Industrial Traffic League; John R. Turney, former chief of the traffic division, office of the Federal coordinator of transportation.

Among matters to be considered are the truckers' stand with regard to railroad competition and competition of railroad-owned trucking companies; and regulatory measures for long and short haul business. The convention will mark the first annual convention at which the National Conference of Truck Tariff Bureaus will be present, and it will also be the first time that the Household Goods Carriers' division meets with the truck operators.



Wide World Photo

Women testers were employed by the Unic automobile factory near Paris during the war and they proved so efficient that since then new Unic chassis are put through their paces by a squad of skilled feminine drivers

The Hall Aluminum Aircraft Co., Bristol, Pa., was awarded a contract Wednesday by the Treasury department for the construction of six coast guard flying boats to be used for patrol and aerial ambulances. The boats will have a 2000-mi. cruising radius and a cruising speed of 110 m.p.h. The contract amounted to \$709,852.

Tire Prices to Be Renewed

Manufacturers Plan No Material Change in Retail Lists or Dealer Discounts

Having enjoyed almost a full year of the most effective price stabilization in the industry's history, tire manufacturers plan a renewal of the present price program Nov. 1 without any material change either in retail prices or dealer discounts. This decision was reached at a recent meeting of tire company executives in New York under the auspices of the Rubber Manufacturers Association. The only probable change in the program may be a realignment of discounts to preferred national accounts, it is understood, with these elevated to the same level as commercial prices. Commercial accounts have been receiving a 10 per cent discount from list prices while preferred national accounts have been receiving a 22½ per cent discount which was equivalent to dealers' net billing. The attempt to standardize all heavy duty prices at the commercial level will be made to correct discount abuses in this sector of the market, manufacturers state. In many markets dealers have been quoting commercial prices at the preferred national basis.

The industry is expected to announce its usual spring dating program under which solicitation of dealer orders will be started Nov. 15 for 1937 delivery on

deferred payment bases controlled by climatic zones of the country.

Plans are complete for the annual convention of the National Association of Independent Tire Dealers which will open Oct. 19 at the Statler Hotel in St. Louis, according to George J. Burger, general manager. Principal issues before the convention will be the preferred national account discount practice of manufacturers, company-owned store competition, and discussion of the Robinson-Patman Act. Under this law two of the industry's major cost-plus private brand tire contracts have been terminated, the Goodyear-Sears Roe-buck tire contract and the Goodrich-Atlas tire contract.

William S. Gilbreath

Col. William S. Gilbreath died last Tuesday in Henry Ford Hospital, Detroit, at the age of 69 after a long illness. Known as the "Father of the Dixie Highway," and a pioneer worker for good roads, he organized the Hoosier Motor Club in 1901. As field secretary of the Dixie Highway Association he gained national fame. In 1916 he went to Detroit as manager of the Detroit Automobile Club.

Japan's Control Body

Automotive Commission with Wide Powers is Appointed

Organization of the Japanese Automobile Industry Commission, a body to control enforcement of the automobile industry protection law, has been provided for by ordinance published in the Official Gazette, Sept. 9. Principal terms of the ordinance, as reported by the Domei Agency, are as follows:

The commission shall be responsible to the Minister of Commerce and Industry. It shall examine items referred to it under the automobile manufacturing law as well as other questions on which it may be consulted by the Minister.

The commission shall be composed of the Minister of Commerce and Industry as chairman and not more than 17 members to be appointed by the cabinet from high officials of the ministries concerned and from men of experience and learning.

Secretaries to deal with the general affairs of the commission under the direction of the chairman shall be appointed by the cabinet.

Members appointed to the newly constituted body include representatives of the leading ministries, university professors, financiers and automobile manufacturers. Appointment of officials of certain automobile companies has aroused unfavorable comment, it is reported, in other motor manufacturing circles which will have no direct

voice in the commission. Chief among the commission's present powers is the allotment of individual subsidies and the granting of licenses.

120 New Studebaker Dealers

One hundred and twenty new Studebaker dealers were appointed by The Studebaker Corp. during the month of September, bringing appointments for the year to date to 710, according to Geo. D. Keller, vice-president.

Automotive Metal Markets

Automotive Demand Takes Half of All Alloy Steels; Use of Quantity Differentials Expands

By William Crawford Hirsch

Backlogs of automotive alloy steel makers are reported to reflect the comfortable position in which the steel industry, as a whole, finds itself with reference to fourth quarter business on

its books. Automotive consumption accounts for about one-half of all the alloy steels made, which last year was estimated to have aggregated 1,500,000 tons. Cold-finished steel bars have also come in for good-sized commitments, affording to finishers the advantage of more unfilled tonnage than they have had in months. Buyers of 300,000 lb. and over at one time have been given an additional 2½ cent quantity differential, making the maximum deduction 15 cents per lb.

The policy of quantity differentials, so as to make the placing of large tonnage orders an inducement to consumers, is spreading. Talk of a \$2 per ton advance in base prices to apply to first quarter 1937 business continues.

According to the leading interest's latest report on shipments of finished steel products, shipments during the first nine months of this year ran about 45 per cent ahead of those made in the corresponding period of last year. It should be noted, however, that in no month did shipments reach the 1,000,000-ton level, which was exceeded during the first four months of 1930. The rate of steel ingot output this week is reported as 75.9 per cent of capacity, indicating a slight rise over the preceding week's rate of 75.3 per cent. Determination of the price of steel rails, which producers claim to have been out of line for some time and which expires Nov. 1, may have considerable effect on the steel market as a whole. There is talk of raising it from the prevailing \$36.37 to \$40.

Pig Iron—Automotive foundries have entered the market on a broader scale and are contracting for round tonnages. Forecasts of an advance to apply on first quarter 1937 business continue.

Aluminum—Better demand for piston metal is noted. Prices are unchanged in both primary and secondary markets.

Copper—A good deal of first quarter business is being booked by copper and brass fabricators from automotive consumers, and the general impression in the copper market is that much of the metal, needed to fill these orders, remains to be bought. The market remains steady and unchanged, with electrolytic copper selling at 9¾ cents.

Tin—Developments in the international monetary situation had an easing effect on the tin market, Spot Straits being quoted on Tuesday at 44½ to 44¾ cents, about ½ cent below the previous trading day's close. Consumers have been offish of late, apparently expecting the market to work lower.

Lead—Steady and active.

Zinc—Quiet and unchanged.

Calendar of Coming Events

SHOWS

Olympia Motor Show, London, England,	Oct. 15-24
Czechoslovakia, 26th International Auto-mo-Exposition, Prague.....	Oct. 16-25
9th International Automobile Salon, Milan, Italy	November
National Motor Truck Show (N. J. Motor Truck Assn.), Newark, N. J.,	Nov. 3-7
Canadian National Automobile Show, Toronto	Nov. 7-14
National Automobile Show, Grand Central Palace, New York	Nov. 11-18
Omaha Automobile Show.....	Nov. 11-15
Philadelphia Automobile Show..	Nov. 12-19
Scottish Motor Show, Glasgow.....	Nov. 13-21
International Aviation Show, Paris, France	Nov. 13-29
Columbus Automobile Show.....	Nov. 14-20
Boston Automobile Show.....	Nov. 14-21
Buffalo Automobile Show.....	Nov. 14-21
Chicago Automobile Show.....	Nov. 14-21
Detroit Automobile Show.....	Nov. 14-21
New Haven Automobile Show.....	Nov. 14-21
Indianapolis Automobile Show.....	Nov. 14-21
San Francisco Automobile Show.....	Nov. 14-21
Washington, D. C., Automobile Show, Nov. 14-21	Nov. 14-21
Cincinnati Automobile Show....	Nov. 15-21
St. Louis Automobile Show.....	Nov. 15-22
Pittsburgh Automobile Show.....	Nov. 16-21
Brooklyn Automobile Show.....	Nov. 21-28
Cleveland Automobile Show.....	Nov. 21-28
Montreal Automobile Show.....	Nov. 21-28
Kansas City Automobile Show.....	Nov. 21-29
Milwaukee Automobile Show.....	Nov. 22-29
Portland Automobile Show.....	Nov. 22-29
Baltimore Automobile Show.....	Nov. 26-Dec. 5
28th Automobile Salon, Brussels, Belgium	Nov. 28-Dec. 9
Peoria Automobile Show.....	Nov. 30-Dec. 5
Natl. Exposition of Power & Mechanical Engineering, Biennial Meeting, New York City	Nov. 30-Dec. 5
First International Consumers Petroleum Exposition, Convention Hall, Detroit	Dec. 5-13
Automotive Service Industries Joint Show, Chicago	Dec. 9-13
National Motor Boat Show, New York, Jan. 8-16	Jan. 8-16
Illinois Automotive Ass'n, 4th Annual Show and Maintenance Exhibit, Navy Pier, Chicago.....	Apr. 24-28, 1937

CONVENTIONS AND MEETINGS

American Trucking Associations, Inc., Third Annual Convention, Chicago,	Oct. 19-21
American Society for Metals, 18th Nat'l Congress, Cleveland, O.....	Oct. 19-23
16th Annual Meeting of the American Welding Society, Cleveland, O.,	Oct. 19-23
American Gas Association, Annual Meeting, Atlantic City.....	Oct. 26-31
American Foundrymen's Ass'n Conference on Foundry Practice, Univ. of Iowa, Iowa City, Ia.....	Oct. 30-31
American Petroleum Institute, Annual Meeting, Chicago	Nov. 9-12
Society of Automotive Engineers Annual Dinner, New York.....	Nov. 12
American Association of Motor Vehicle Administrators, Annual Meeting, Hot Springs, Ark.	Nov. 12-14
International Day, National Automobile Show, New York	Nov. 16
National Foreign Trade Convention, Chicago	Nov. 18-20
16th Annual Meeting, Highway Research Board of the National Research Council, Washington, D. C.	Nov. 18-26
International Acetylene Ass'n, 37th Annual Convention, St. Louis, Nov. 18-20	Nov. 18-20
Natl. Industrial Traffic League, Annual Meeting, New York City....	Nov. 19-20
Tin Can Tourists' Get-Together Meeting, Lake City, Fla.	Nov. 22-28
Tin Can Tourists' Homecoming, Arcadia, Fla.	Dec. 28, 1936-Jan. 3, 1937
S. A. E. Annual Meeting, Detroit, Mich., Jan. 11-15, 1937	Jan. 11-15, 1937
Tin Can Tourists' Winter Convention, Clearwater, Fla.	Jan. 29-Feb. 8, 1937
Tin Can Tourists' Annual Convention, Sarasota, Fla.	Feb. 8-14, 1937
41st Annual Convention and Exposition of the American Foundrymen's Association, Milwaukee, beginning May 2, 1937	beginning May 2, 1937

CONTESTS

500-Mile International Sweepstakes, Los Angeles Raceway	Nov. 29
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The Horizons of Business

By Joseph Stagg Lawrence

Business Discounts the Election

THE campaign swings into the home stretch. Both candidates are vigorously carrying their pleas and their personalities to the voters. Dozens of straw votes are being taken to anticipate, if possible, the outcome of the most important election since Lincoln defeated Douglas. While this stirring last lap sprint for the electoral tape reaches its climax the stock market develops an exuberant mood. Carloadings total 813,000, steel operations are at 75½ per cent of capacity, construction is 70 per cent ahead of last year, the banks are definitely increasing their loans for business purposes, net new capital issues show a distinct upward trend, unemployment, except insofar as business must ultimately bear the burden, has ceased to be an economic and is now but a political issue.

The Message of the Market

The articulation of the stock market is not always clear. Its messages, like those of mythological oracles, are often equivocal. On this occasion, however, the market is saying in unmistakable terms, first, that business is going ahead and, second, that the outcome of the election will be satisfactory to business.

What does this second message mean? Does it mean the election of Landon or does it mean that even if Roosevelt is re-elected business has nothing to fear?

The Forecasts

This pre-election business and speculative spurt has made most of the forecasters feel like the sports writers on the morning after the Louis-Schmeling fight. The clairvoyant commentators of business rested their arguments on excellent logic. This was not an ordinary election. The question was not, "Who will be our next President?" but rather, "What will be the fate of American institutions?" It was generally agreed that the re-election of the President would change our form of government and usher in, frankly, the new form of society for which the

present administration seems to have been preparing during the first period of its tenure. In the face of such portentous uncertainty business would pause. Enterprise would hold its breath until the gravest issue of the century was settled.

An expected paralysis of fear has given way to a festive spirit. Why has the business world lost its apprehension over the outcome of the election? Is this attitude of hope well founded?

An Established Character

At the middle of the year the present administration was several laps ahead of any previous administration as a baiter of business, a class agitator, a foe of wealth, a fiend of political spoilsmen, a repudiator of pledges, an indulgent provider for clamorous minorities and a friendly bosom for wild-eyed theorists. It may be that this character was necessary first, to preserve the republic from the danger of revolution and, second, to promote the general welfare. There are millions of intelligent and sincere people who believe deeply that this is the case. Very few of these, in proportion to the total, are to be found among our business leaders. This does not impeach either the sincerity or the merit of the New Deal convictions.

Why do business men so seriously agitated three months ago by the possibility of another four years of Roosevelt today view this prospect with calm?

Prodigious Adaptation

In the first place the President has consummated a prodigious program of adaptation. He has boundless ambition and is unhampered by principles. He likes his job. He would much prefer to occupy the White House another four years than return to private life. As an astute politician he is striving to do whatever is necessary to accomplish this. If it means another hundred million for "relief" in a doubtful state, no abstract notion of public accountability deters him. If it means a peace overture to the harassed utilities, a promise of monetary stabilization, the

pledge of economy and a balanced budget, a truce upon added taxes, a house cleaning in the government service, a gag for the brain trustees, and the homage of silence for the Supreme Court, all these he will promise in order to live in the White House another four years. Not being inhibited by any fundamental convictions to the contrary, or in fact of any sort, he probably intends to fulfill these promises as sincerely as he intended to fulfill the promises made in the previous campaign. This is not intended to be facetious.

Credit Without Responsibility

It is clear that some of these promises are utterly inconsistent with his conduct during the past four years. For example, the President extending the olive branch to the utilities is a proper subject for "Believe-It-or-Not" Ripley. Yet we have it on excellent authority that the President has given the utility leaders assurance that the pressure of the government on this industry has ceased. It is true that in many of these shifts, made for the palpable purposes of conciliating an indignant and apprehensive public, the President has not played his cards directly. There is no public announcement that the government will call off the war against the utilities. There is no direct statement by the President that he will stabilize the currency and return to gold. Mr. Morgenthau originates this impression. A couple of Congressional stooges carry the tax ball for the President. All matters relating to economy and a balanced budget are left to Mr. Morgenthau. It is an adroit use of the government's multiple personality. Thus if it becomes feasible during the next four years to change his course and his critics again charge him with broken pledges, the President can always say, "Oh, those promises were made by several other fellows. I never made such promises."

According to Plan

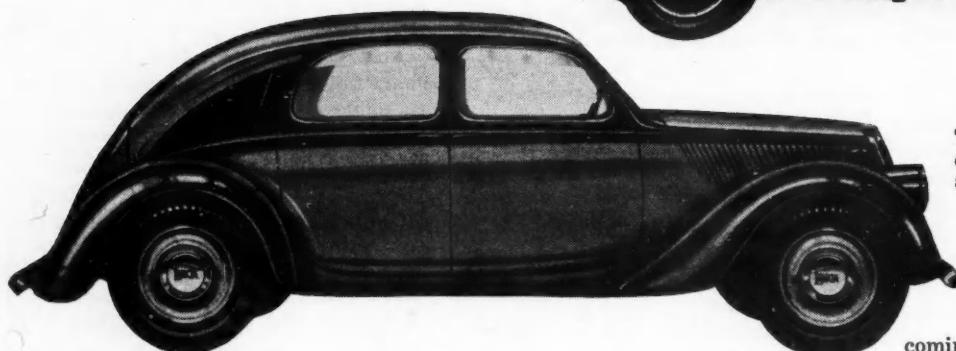
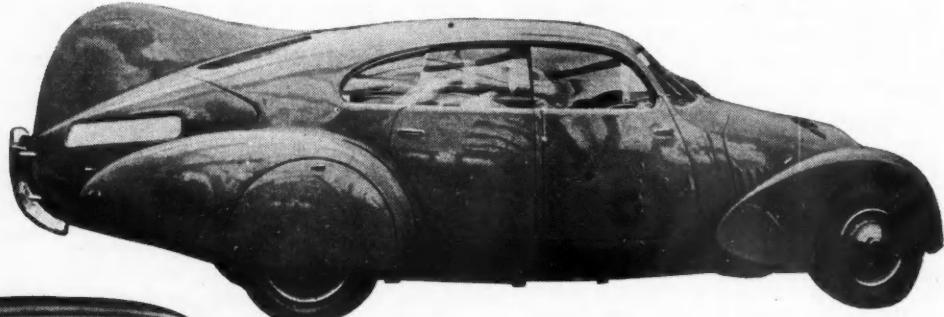
The fact is, and it does not flatter the sophistication of the business world, that the pre-election tactics of the administration are having precisely the
(Turn to page 528, please)



By
W. F.
Bradley

At the Paris Show—

Peugeot rear-engined car.
Note the stabilizer on the rear and the streamlining throughout



The Lancia shown at the left was designed very much after the average 4-door sedan of American make

SIGNS of labor troubles, political unrest, and international complications were all too present at the thirtieth annual Paris automobile salon which opened in the Grand Palais on October 1.

Instead of the brilliant anniversary it might have been, the show was dull; few new models were presented, and members of the industry appeared to be more occupied in scanning the political horizon than in preparing production programs and signing dealer contracts.

In the passenger-car section the number of exhibitors reached the low level of 51, of which 22 were French, nine

American, eight German, six English, three Italian and 2 from Czechoslovakia. American firms having booths were Auburn-Cord, De Soto, Dodge, Graham, Lincoln, Ford, Packard, Plymouth and Studebaker. In addition, there was a truck and coach section in the basement of the handsome Champs-Elysees palace with 21 chassis exhibitors and as many more showing complete vehicles.

In June practically every automobile factory in France was taken possession of by strikers. The paralyzing effect of this movement, which resulted in more complete recognition of the unions, paid holidays and the forth-

coming application of the 40-hour week, is clearly seen in the absence of new designs on the stands of French makers. Even where new models had been designed, and in some cases announced to dealers, they were not present in the hall.

Devaluation came with the opening of the show, but this condition only tended to add to the confusion. Prices were on the increase, Fiat announced price boosts of from 10 to 12 per cent on all models, while many makers were reluctant to give prices because of the troubled outlook.

General tendencies showed few changes. In the matter of independent suspension conditions remained as before. Renault, Hotchkiss and Panhard are the only three important makers adhering to solid axles. Citroen has

made no change of any importance, other than the adoption of a system of rack steering. A passenger car Diesel was expected, but this has not materialized. Renault changes are of a minor nature: water jackets the full length of the cylinder barrels, a new steering gear, and body modifications.

Voisin announced a straight twelve. This was not at the show, but descriptive matter was available. With a piston displacement of 366 cubic inches, the forward end of the engine is only slightly ahead of the front axle, and the inconvenience of the long engine is overcome by lodging the passengers' legs on the sides of the engine, with

inder block is an aluminum-alloy casting with pressed-in iron liners, aluminum head with overhead valves, hemispherical combustion chamber, centrally placed spark plug and duralumin rods. The engine has elastic mounting in the chassis. This design gives a very compact powerplant, developing 55 hp. at 4200 r.p.m. The hood is extended over the cowl to give the long line demanded by modern fashion.

In the front, Lancia's well-known system of independent suspension is used, with coil springs and hydraulic damper. The rear is also independent, with a system of transverse springs and torsion bars. This is the first time

photograph is reproduced herewith. Rear wheels are enclosed and the body has a tail fin to improve the aerodynamic stability.

Compression ratios have been increased with the more extensive use of aluminum heads. There is an increased use of the down-draft carburetor. Automatic gearshifts show no development. Talbot in France is the only firm fitting the Wilson planetary pre-selective set. Chenard & Walcker, Salmson, and Peugeot supply the Cotal planetary gear with electromagnetic control as optional equipment.

Front wheel drive shows no change. It is fitted on some of the German light cars and is used by Citroen, Chenard & Walcker, Rosengart, and G. Irat among the French makers.

The German Hanomag Company exhibits a passenger car Diesel. The two models are a four-cylinder of 100 cu. in., developing 32 hp., and a six-cylinder of 146 cu. in. giving 50 hp. With a four-passenger sedan body the weight is approximately 2650 lb. The Hanomag Diesel is of the precombustion-chamber type, having magnesium-alloy pistons with cast-iron ring carriers. Lead bronze is used for the five bearings of the crankshaft and the maximum engine speed is 3500 r.p.m.

Running boards have practically disappeared, all bodies being made full chassis width to accommodate three abreast. Cover plates are becoming general for the rear wheels, but are less frequently employed at the front. Panhard fits these plates at both front and rear, but the space between the cover and the wheel is sufficient to allow the latter to be removed without disturbing the cover. This firm also has a fixed windshield with two end panels at 45 deg., this giving two very narrow posts instead of the single wide one and almost entirely eliminates the dead angle.

Nine American makers help to make up the list of 51 exhibitors of passenger cars

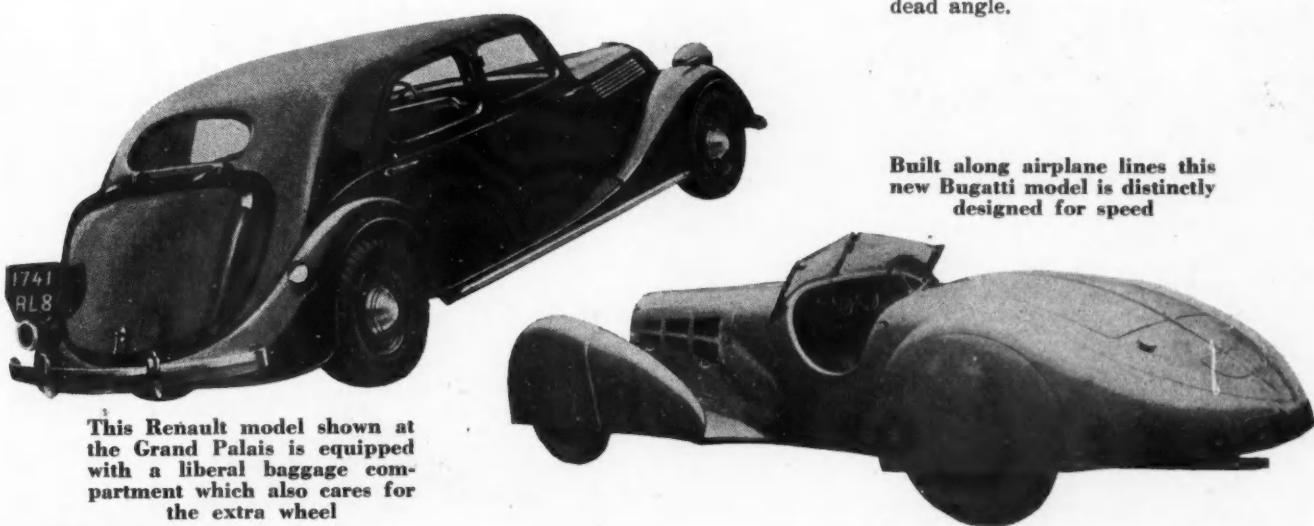
the steering gear mounted on the level of No. 3 cylinder. The central seats provide for three, the rear seats for two abreast, all seats being within the wheelbase. Baggage and spare wheel overhang, but are all enclosed. (This car was illustrated and described in AUTOMOTIVE INDUSTRIES of August 29, 1936.)

An entirely new model is shown by Lancia. The four cylinder V-type engine is 72 by 83 mm. (2.84 by 3.27 in.) bore and stroke (85 cu. in.). The cyl-

Lancia has used independent suspension at both front and rear.

There is a central tunnel covering the drive shaft, but the chassis platform is the full width of the chassis. There are no running boards, and the under surface is absolutely flat. With a wheelbase of 112 in. and an overall length of 151 in., the weight of the complete chassis is 1270 lb., and the weight of the complete sedan 1825 lb.

Peugeot shows a new rear-engined highly streamlined model of which a

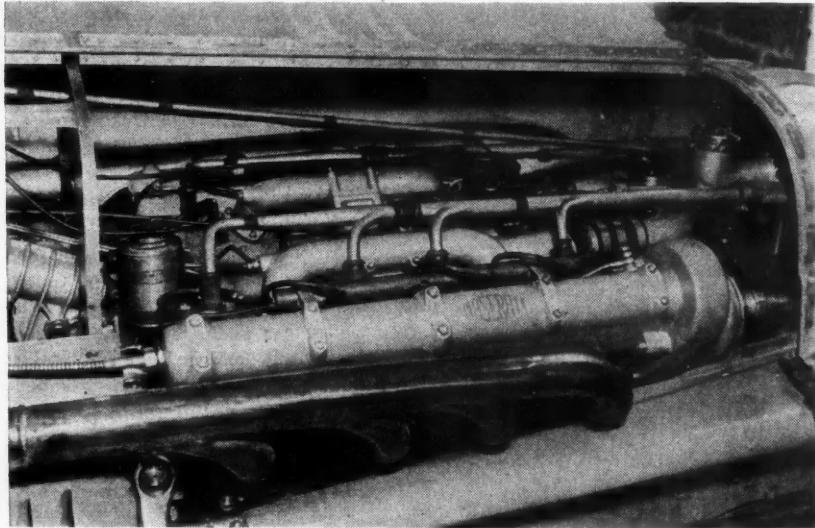


This Renault model shown at the Grand Palais is equipped with a liberal baggage compartment which also cares for the extra wheel

Built along airplane lines this new Bugatti model is distinctly designed for speed

Italian Driver Wins Columbus

By Bill Toboldt

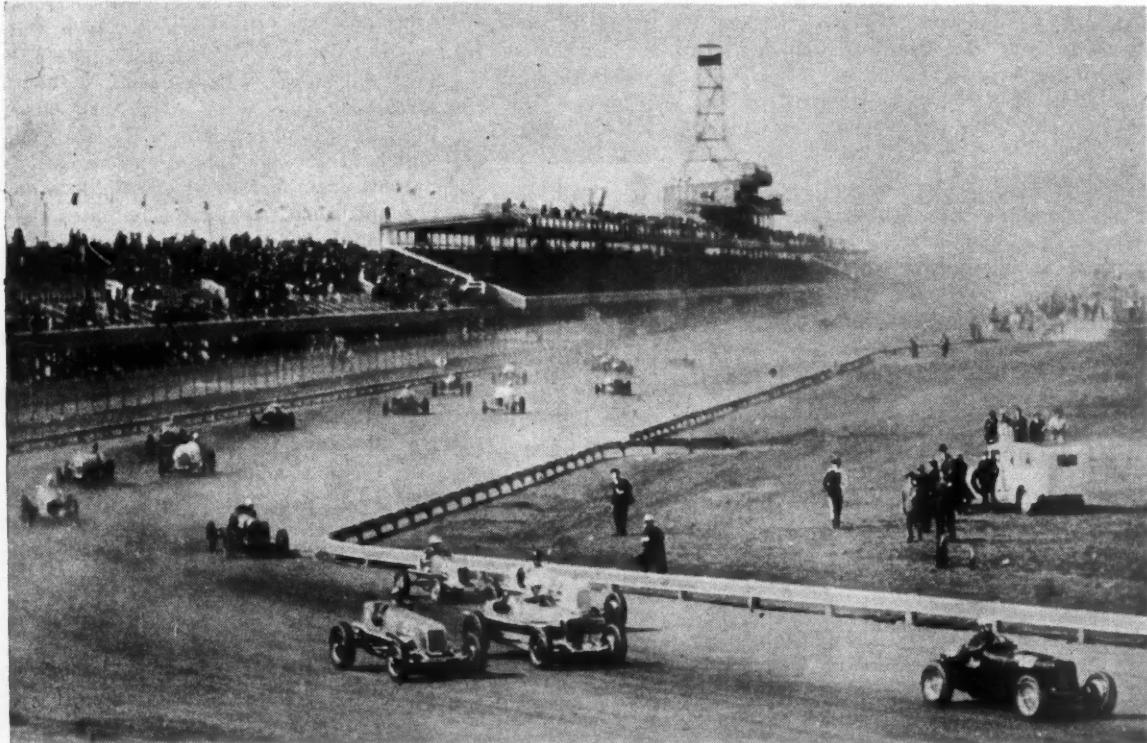


Right side view of Philippe Etancelin's Maserati

TAZIO NUVOLARI of Italy averaging 65.998 m.p.h., Wimille of France at 63.225 m.p.h., Brivio of Italy at 62.994 m.p.h., Sommer of France at 62.719 m.p.h. and McEvoy of Australia at 60.518 m.p.h., were the first five cars to cross the finish line at the end of the grueling 300-mile revival of the Vanderbilt Cup Race held at the new Roosevelt Raceway at Westbury, L. I. Only four Americans were among the first ten to finish, Mauri Rose in sixth place, Bill Cummings, seventh, Deacon Litz, ninth, and Chuck Tabor, tenth.

Disappointment in America's showing is somewhat tempered by the fact

A view of a few of the forty-five racing cars from five nations as they rounded the first turn at the start of the 300-mile race for the Vanderbilt Cup



Acme photo

Day Epic

that American race cars have been developed particularly for tracks such as Indianapolis which tests the engines primarily, whereas European race cars are designed for road racing which the new Roosevelt track approximates. Such racing requires not only engines but adequate transmissions, clutches and brakes. In addition, many of the foreign cars were equipped with electro-vacuum gear shifting devices (similar to the Bendix) permitting pre-selection of gears.

As a result, the foreign drivers could pre-select the desired gear as they came down the straightaway, maintain top speed for a longer time than the Americans because of more adequate brakes, and then shift quickly by a simple movement of the clutch pedal and once through the curve have greater acceleration.

The Americans, on the other hand, made little use of their transmissions and because of smaller brakes were forced to shut off at an earlier point on the straightaways.

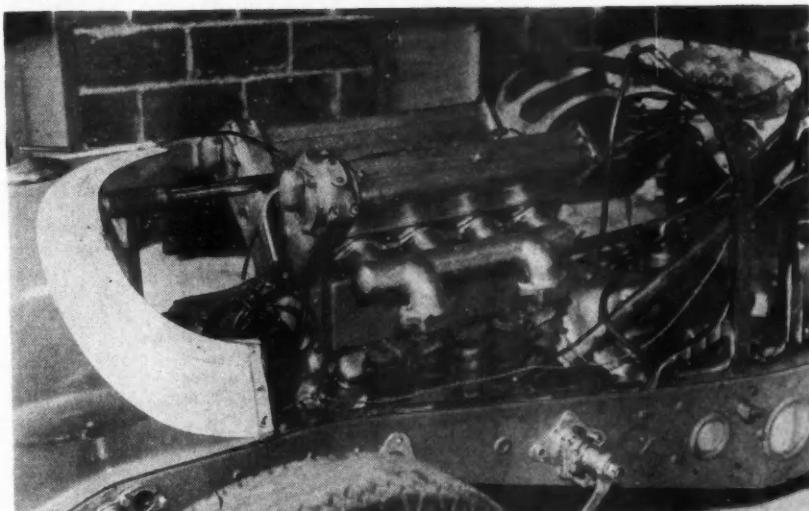
Another point that must not be lost sight of in studying the European victory is that the teams, for the most part, are backed by the car factories, while the American cars are the result of the individual drivers.

Supercharging also played its part in the victory. All the foreign cars were fitted with Roots type blowers, while only five American cars, the Topping Special driven by Babe Stapp, the Harry Hartz entry driven by Horn, the two Duray Specials and a Bugatti piloted by Dave Evans, were so equipped. In this connection it is interesting to note that no supercharger trouble developed during the race.

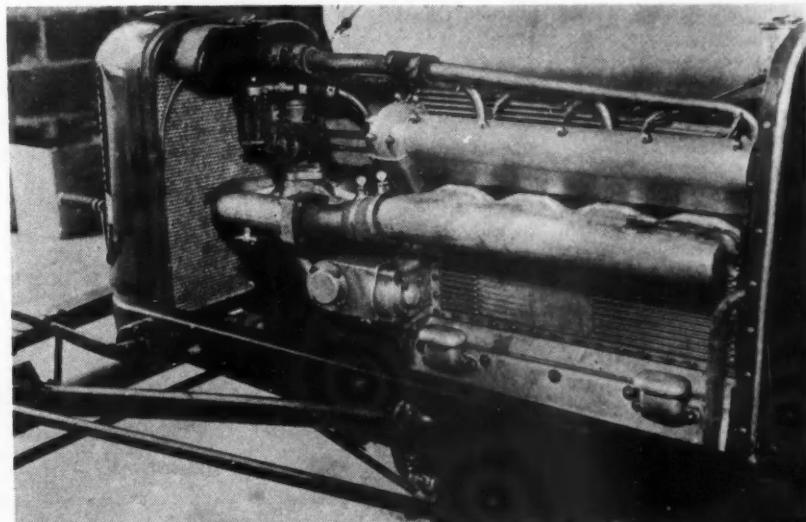
In fact, there was very little mechanical trouble of any sort during the race.



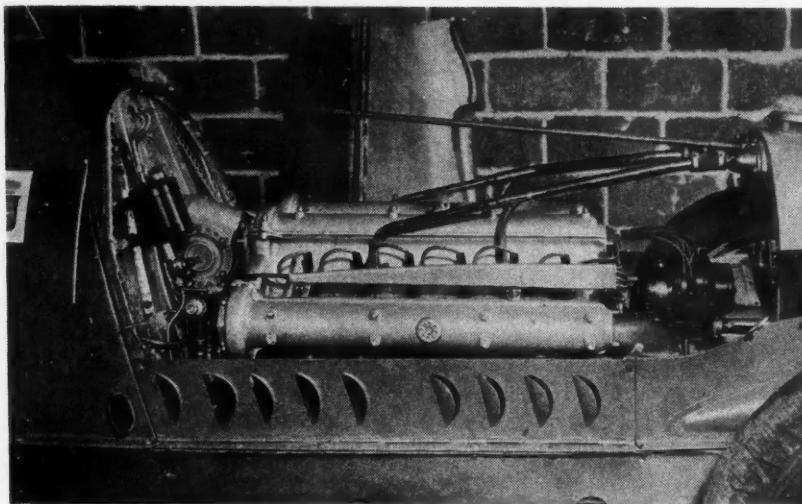
George Vanderbilt, the donor (left), is shown presenting the new Vanderbilt Cup to Tazio Nuvolari, Italian driver



Left side of Topping special, Stapp driving



Leon Duray special, Tony Gulotta driving



Right side view of 12-cyl. Alfa Romeo

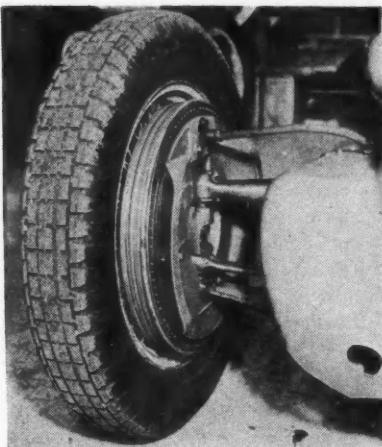
In all, 45 cars faced the starter's flag and at the end of the 300 miles thirty cars were still running.

Shock absorbers and shock absorber links gave the most trouble. This was undoubtedly the result of the result of the track as there were holes 6 in. deep on many of the turns by the time the two hundred mile mark was reached. The straightaways, however, were still in good con-

Data from the Roosevelt Raceway of Interest to

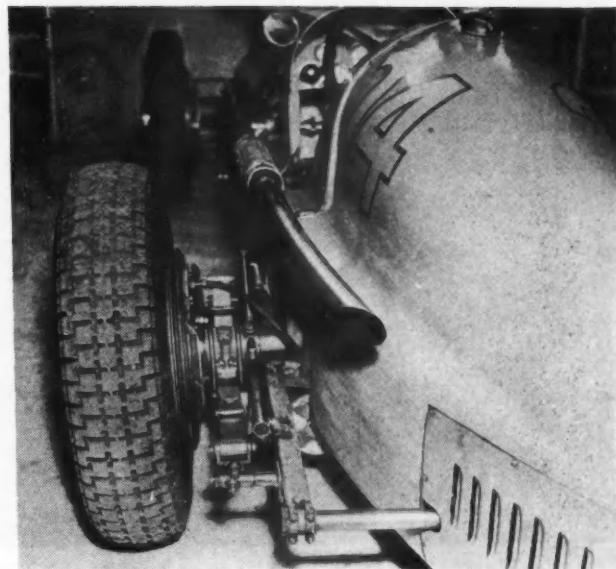
Car No.	Make	Entered By	Driver	Cyl.	Bore	Stroke	Displacement	Drive	Weight	Super-charger	Brakes	Carburetor No. Used	Make	Spark Plug
8	Alfa Romeo	Tazio Nuvolari	12	2.756	3.464	246.4	R	1650	Yes	H	1	W	G	
10	Alfa Romeo	Giuseppe Farina	12	2.756	3.464	246.4	R	1650	Yes	H	1	W	G	
9	Alfa Romeo	Antonio Brivio—Punticuda	12	2.756	3.464	246.4	R	1650	Yes	H	1	W	C	
16	Alfa Romeo	Raymond Sommer	8	2.834	3.937	195.2	R	1608	Yes	H	1	W	B	
24	Maserati	Philippe Etancelin	8	3.3	4.2	292.8	R	1650	Yes	H	1	W	B	
12	Maserati	Freddy McEvoy	6	2.44	3.84	91.5	R	1320	Yes	H	1	W	B	
29	Maserati	Raph.	8	3.3	4.2	292.8	R	1650	Yes	H	1	W	C	
48	Maserati	Maj. A. T. G. Gardner	4	2.716	3.937	91.2	R	1200	Yes	H	1	S	C	
18	Bugatti	Jean Pierre Wimille	8	3.31	4.21	288.7	R	1630	Yes	M	1	S	B	
45	E R A.	Earl Howe	6	2.247	3.750	89.2	R	1350	Yes	M	1	S	B	
46	E R A.	P. G. Fairfield	6	2.247	3.750	89.2	R	1350	Yes	M	1	S	B	
49	Bugatti	Overton A. Phillips	8	2.375	3.937	143.8	R	1800	Yes	M	1	S	C	
7	Miller Special	James M. Winn	4	4.250	4.500	256.0	R	1840	No	H	2	M	C	
62	Marion-Miller Special	Milt Marion	4	4.125	4.125	220.0	R	1800	No	H	2	W	C	
6	Gardner Special	Chester L. Gardner	4	4.250	4.500	255.0	R	1900	No	H	2	W	C	
21	Topping Special	Henry J. Toppin, Jr.	4	4.062	4.500	234.0	R	1800	Yes	H	1	W	B	
2	Boyle Products Special	H. C. Henning	8	3.375	3.750	288.0	R	2000	No	H	2	M	C	
32	Burd Piston Ring Special	Lou Moore	4	4.312	4.625	270.0	R	1575	No	H	2	W	C	
3	Gilmor Special	Wilbur Shaw	4	4.250	4.500	255.0	R	1800	No	H	2	W	C	
15	Thompson Products Special	Deacon Litz	4	4.125	4.250	220.0	R	1830	No	H	2	W	C	
5	Miller Special	Wm. "Shorty" Cantion	4	4.062	4.750	247.0	R	1800	No	H	2	W	C	
27	Miller Special	Wm. S. White	4	4.125	4.625	247.0	R	1800	No	H	2	W	C	
51	Hogan Special	Dan F. Hogan	4	3.062	3.500	104.0	R	1100	No	M	1	L	C	
52	Schallnau Special	Vergil Williams	8	2.875	5.000	252.0	R	1950	No	M	2	W	C	
28	Halley Bugatti Special	McClure Halley	8	2.382	3.937	142.0	R	1350	Yes	M	1	Z	C	
67	Ambler Special	R. B. Lynch	4	4.724	5.118	359.0	R	1900	No	H	2	W	C	
66	Ambler Special	William Watts	4	4.724	5.118	359.0	R	1900	No	H	2	W	C	
14	Elgin Piston Pin Special	Elgin Piston Pin Co.	4	4.250	4.500	255.0	R	1800	No	H	2	W	C	
59	Miller-Duesenberg Special	Rick Decker	8	2.762	3.500	172.0	R	1450	No	H	2	C	C	
53	Junior Offenhauser Special	Ruth Rastelli	4	3.082	3.500	105.0	R	1150	No	H	2	W	C	
61	Miller Special	John L. Buckley	4	4.250	4.125	235.0	R	1900	Yes	H	2	W	C	
4	Burd Piston Ring Special	Joe Lenck	4	4.250	4.500	255.0	R	2000	No	H	2	W	C	
36	Carew Special	John Campbell	4	4.000	4.250	212.0	R	2011	No	H	2	W	C	
34	American Twist Drill Special	Carl Wagney and Ted Nowak	8	3.062	4.250	250.0	R	1900	No	H	2	W	C	
38	Joe Thorne Special	Joe Thorne, Inc.	4	4.250	4.750	270.0	R	1850	No	H	2	W	C	
23	Joe Thorne Special	Joe Thorne, Inc.	4	4.125	4.250	255.0	R	1750	No	H	2	W	C	
25	Joe Thorne Special	Joe Thorne, Inc.	4	4.125	4.250	255.0	R	1750	No	H	2	W	C	
22	Hartz Special	Harry Hartz	8	2.875	3.500	182.0	R	1850	Yes	H	1	W	C	
44	Leon Duray Special	Leon Duray	4	4.062	4.250	220.0	R	1450	Yes	H	1	W	C	
42	Leon Duray Special	Leon Duray	4	4.062	4.250	220.0	R	1450	Yes	H	1	W	C	
65	De Palma Miller Special	Louis Kimmel	8	2.750	3.750	179.0	R	1800	No	H	2	W	C	
26	Shafra Special	Phil (Red) Shafer	8	3.181	4.625	284.0	R	2450	No	M	2	Y	C	
43	Mid-West Red Lion Special	Mid-West Racing Team	4	4.250	4.500	255.0	R	2000	No	H	2	W	C	
17	Miller Special	Chester Gardner	4	4.125	4.250	220.0	R	1457	No	H	2	W	C	
37	E R A.	John Fell	6	2.2475	3.750	90.0	R	1520	Yes	M	1	W	B	
57	G W Special	George Wingerter	8	3.000	5.000	300.0	R	1850	No	H	2	W	B	

ABBREVIATIONS: B—Bosch Be—Belven Bo—Bowes C—Champion Ca—Carter DR—Delco Remy ES—Edison-Splitdorf H—Hydraulic L—Linkert M—Mechanical Mi—Miller



(Above) Front wheel suspension of Philippe Etancelin's Maserati

(Right) Independent rear - wheel suspension of Maserati driven by Philippe Etancelin

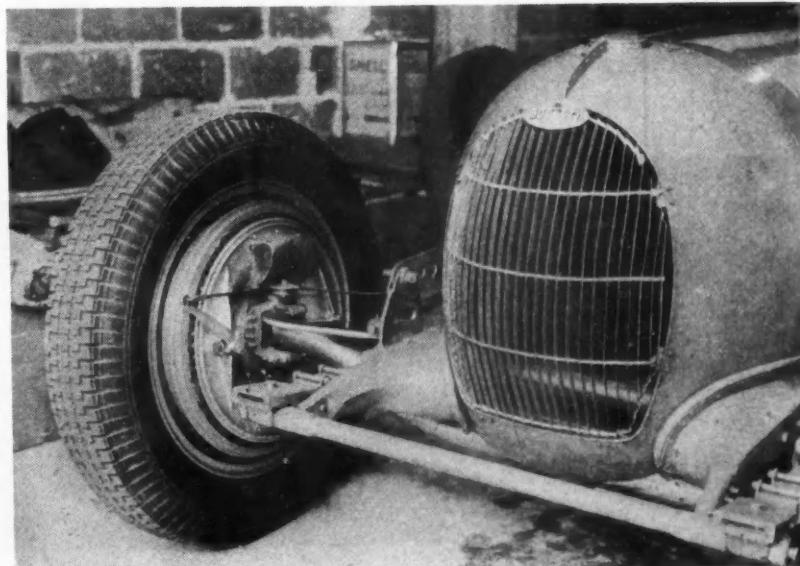
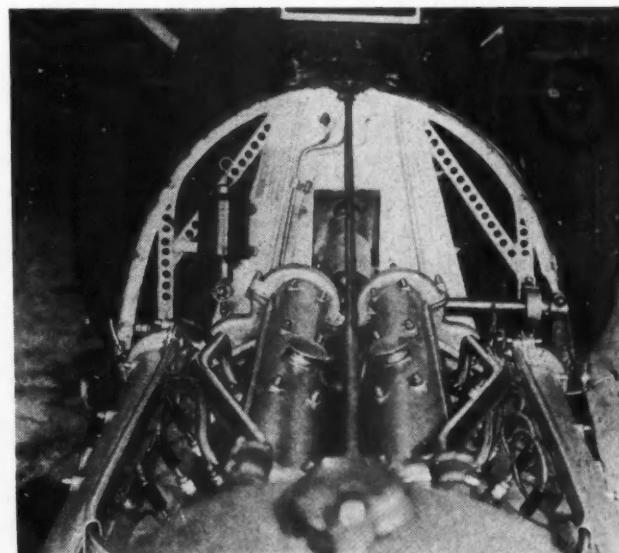


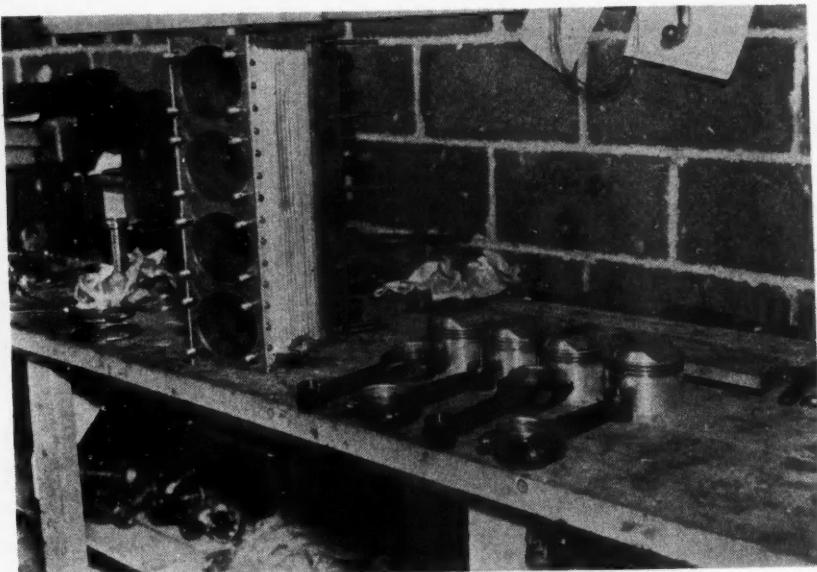
Tests to Engineers

Make	Spark Plug Mag.	Ign. Cable	Make of Engine	Qual. Time	Average Speed or Cause of Failure	No. of Pit Stops
W	C	B	Alfa Romeo	69.929	65.998	2
W	C	B	Alfa Romeo	68.939	Hit Wall	
W	C	B	Alfa Romeo	67.030	62.994	5
W	C	B	Alfa Romeo	63.768	62.719	1
W	B	B	Maserati	60.202	60.182	4
W	B	S	Maserati	60.428	60.518	2
W	B	B	Maserati	64.182	.....
S	C	S	Maserati	59.662	R A F	3
S	B	B	Bugatti	64.981	63.225	3
S	B	S	E R A	58.270	R A F	2
S	B	S	E R A	63.018	R A F	2
S	C	B	Bugatti	57.137	Conn. Rod	
M	C	B	Miller	66.557	Ring Gear	4
W	C	B	Miller	63.714	Clutch	1
W	C	B	Offenhauser	65.922	59.189	3
W	B	B	Miller Marine	60.503	R A F	4
M	C	B	Offenhauser	61.638	60.460	2
W	C	B	Offenhauser	62.929	60.486	2
W	C	B	Offenhauser	65.818	Hit Wall	
M	C	B	Offenhauser	61.704	59.781	2
W	C	B	Miller	66.118	Burned valves	7
W	C	B	Miller	65.263	R A F	2
L	C	B	Offenhauser	66.328	R A F	3
W	C	S	Duesenberg	56.556	R A F	4
Z	C	B	Bugatti	59.920	R A F	1
W	C	S	Hisco	60.304	58.601	5
W	C	B	Hisco	64.118	R A F	2
G	C	B	Brisko	59.680	60.486	5
W	C	B	Duesenberg	63.523	R A F	1
W	C	ES	Offenhauser	62.299	R A F	6
V	C	B	Miller	51.452	.....
V	C	B	Offenhauser	61.311	58.840	2
V	C	P	Cragar	60.156	R A F	3
V	C	B	Studebaker	61.635	R A F	3
V	C	B	Offenhauser	58.781	Universal	2
V	C	B	Offenhauser	59.606	R A F	3
V	C	B	Offenhauser	60.487	.....	3
V	C	B	Miller	63.703	Engine	2
V	C	B	Offenhauser	57.402	58.522	2
V	C	B	Offenhauser	64.348	Steering Gear	
V	C	B	Miller	59.721	R A F	2
V	C	B	Bulck	58.206	R A F	1
V	C	B	Offenhauser	63.908	R A F	2
V	C	B	Miller	65.036	R A F	6
V	C	S	E R A	57.760	R A F	3
V	C	B	Duesenberg	58.350	R A F	8

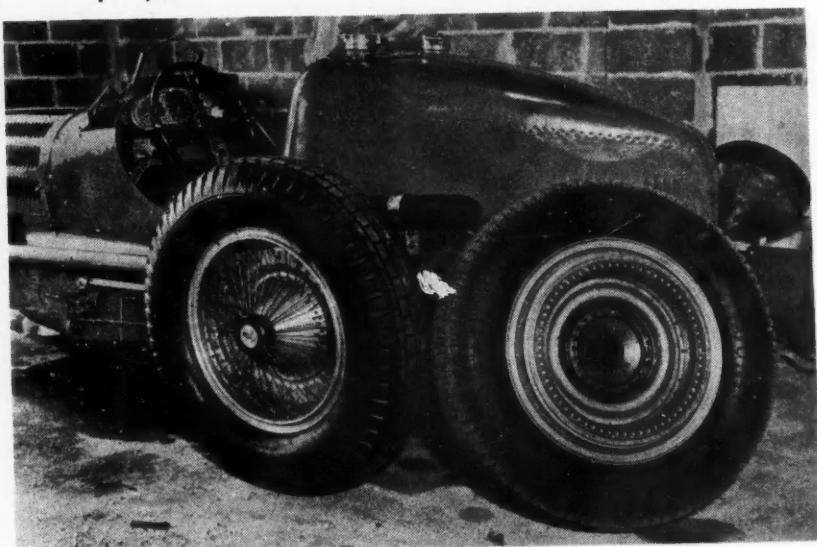
Looking back over radiator of 12 cyl. Alfa Romeo engine and cowl

(Below) Front of Wimille's Bugatti showing wheel mounting and brake operating cable

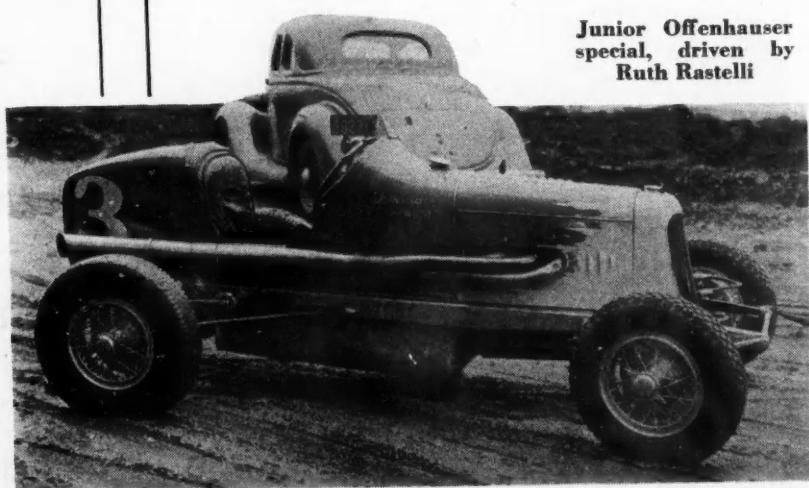




Connecting rods, pistons, and cylinder block of Midwest Red Lion Special



Rear of Bugatti, showing inside and outside of special wheel construction.
Car driven by Jean Pierre Wimille



Junior Offenhauser special, driven by Ruth Rastelli

dition at the end of the race. In this connection, the foreign entries, with independently sprung wheels, had the advantage.

Among those cars eliminated as the result of skidding into the guard rail were Wilbur Shaw's Gilmore Special and the Alfa Romeo driven by Farina. Shaw hit the wall on his first lap at the end of the straightaway, while Farina lasted 18 laps.

Billy Winn, who was well up with the leaders, and for a time was riding in second place, was eliminated on his 65th lap when his rear axle ring gear failed. Ted Horn, who was piloting the Hartz entry and was working up through the field, passed out of the picture late in the race when he was unable to restart his engine after stopping at the pits for fuel.

A clogged cooling system, which eventually resulted in burned valves, caused Shorty Cantlon to withdraw on his 33rd lap. Milt Marion was eliminated when his clutch shaft broke. Defective universal joints and a sheared steering gear caused the withdrawal of Joe Thorne and Tony Willman respectively. Phillip's Bugatti suffered a broken connecting rod on the seventh lap.

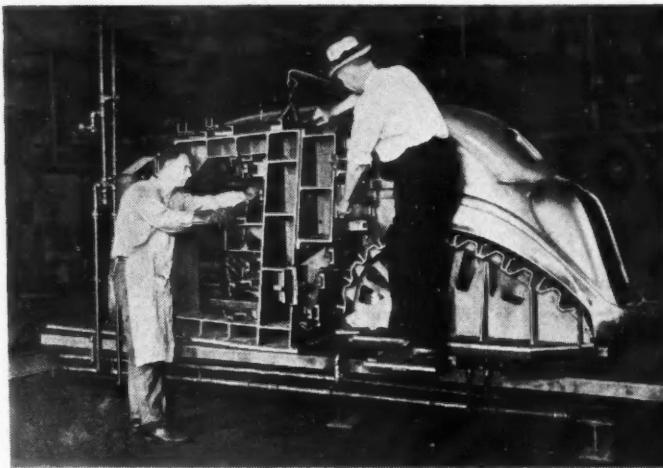
Only five cars found it necessary to change spark plugs and the official pit stops recorded only a single tire change. In this connection, Firestone tires were used almost exclusively by all the American-entered cars, while Dunlops and Pirelli tires were used by the English and Italians respectively. As an aid to traction, tires of larger section were used on the rear wheels, and instead of smooth tread tires, which is common practice at Indianapolis, tires with non-skid tread were used.

As noted in the accompanying table, Bosch magnetos were used by the majority of the entrants, although Scintilla, Edison-Splitdorf and Delco-Remy battery ignition were also used. Thirty-seven cars were fitted with Champion spark plugs, while six had Bosch and one, Bowes plugs.

New Departure bearings were used extensively as was Packard ignition cable.

No information is available on the amount of fuel using during the race. However, it is interesting to note that most of the foreign entries made two stops for fuel, whereas the majority of the Americans made only one. This was probably the result of the fuel limits set at the recent Indianapolis race.

Compression ratio ranged from 10 to 12 to 1 and a typical fuel consisted of 48 per cent Benzol, 48 per cent methyl alcohol, 4 per cent gasoline and approximately 3 to 5 c.c. of tetra ethyl lead per gallon of fuel.



Inspection rigs for the checking of bodies are among the new devices installed by Dodge. The rigs are operating in batteries

Safety Accents

Let it be known that 1937 cars will place the accent on safety in no uncertain fashion. Door handles are being curved in to the panel to eliminate sharp projections. And one car will come through with all instrument panel knobs flush with the panel—a given control button will project out only when in use. Later in the season one of the lines will add a horn ring which will make it possible to signal without removing the hand from the wheel. Another line will add, after show time, a special engine driven vacuum pump to supply power for windshield wipers. This will assure a positive drive under all conditions, particularly when ascending grades in bad weather.

Sunshine Roofs

A prominent autobody builder has corralled exclusive rights under a broad patent covering the design of a practical "sunshine roof" which can be produced at low cost. This roof represents the most workable job developed in Europe. At the moment this construction has not been proposed for passenger car bodies. However, 2500 taxicabs have been built with this roof and have given excellent service.

New Broach

To meet the problem of broaching cast iron parts with hard scale surface, X-L-O has designed a special broaching tool with inserted teeth. The tool is in three principal sections, two narrow-faced sections set up in form of V with open end as entering edge, and one wide section at the end for finishing. This tool is used for

broaching a cylinder head. The idea is that instead of attempting to cut through the entire width of scale area with single teeth, small cuts are taken by small individual cutting surfaces, the V-form being used to subtend the entire area within the range of the stroke of the ram. The finishing sections takes the whole width in one pass.

Cast Rubber

The current issue of the *Industrial Bulletin* has an interesting contribution on a new process of casting rubber into various useful forms. This is a European development called the "Kaysam" process but it is having its commercial possibilities more generally exploited in this country. For raw material the process utilizes a highly concentrated form of latex called "Revertex" containing between 60 and 65 per cent of rubber and other solid ingredients.

Auto Trailers

What with the impetus given the auto trailer business this year, we may expect to see many natural refinements in design and construction in the near future. Steel frames and perhaps welded tubular structures may not be too far away. And some may surely consider the use of aluminum sheet for the roof and sides, in combination with aluminum alloy structural members.

How Much?

The largest production of aluminum in any year was approximately 280,000 tons in 1929, taking in all the alumi-

Production Lines

num producing countries in the world. It is quite probable that a new world production record will be established in 1936.

Repaint Kinks

Ditzler has just brought out a very handsome 32-page book dealing with time-tried and preferred procedure for repainting in all types of finishes. Procedures are given for various grades of work on passenger car bodies and commercial bodies, with particular emphasis on synthetic finishes. This bulletin is priced 50 cents, but to our readers it's free, if you ask for it right away. Mention the "Ditzler Repaint Manual" if interested.

With Plastics

Some interesting and new applications of modeled plastics are in the offing. One is the development of a horn body in plastic material, featuring better tone quality as well as lower cost. Another development is a molded water pump impeller which may be produced from a composition which is said to be resistant to water and oil and anti-freeze materials. Refer inquiries to Durez General Plastics.

Honing Facts

Have you a copy of the combination handbook and catalogue on honing recently issued by Hutto? It's well worth reading and contains information of interest to engineers and production men. We can get you a copy if you want it.—J. G.

MANUFACTURING
MANAGEMENT
METALLURGY



Cutaway view of Buick 40 special sedan body with built-in trunk

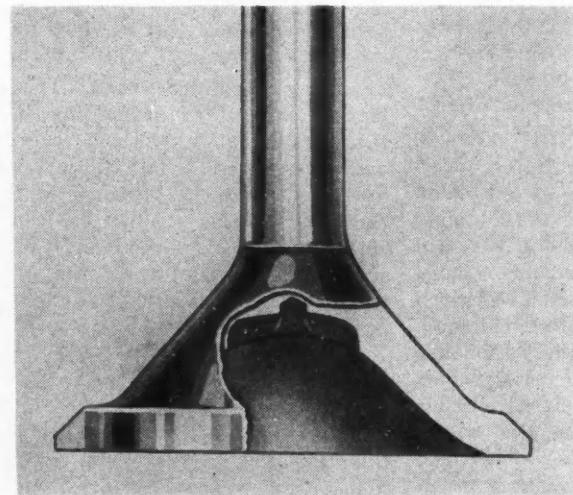
Buick

TWO entirely new cars, Series 40 and 60, head the Buick line for 1937. New all-steel bodies, new frames with I-beam-section X member, hypoid rear axles, and a new and distinctive front-end styling are among the most noteworthy features. The Series 80 and 90 continue their former mechanical features, but are improved with respect to performance, riding ease, and serviceability by a host of refinements in design and production.

All four lines have the same characteristic front-end styling, featuring a two-piece, die-cast radiator grille with horizontal bars, a unique "tailoring" of hood top and sides, headlamps faired into the deep radiator shells, and one-piece front fenders of a design that must have involved difficult production problems. Ten color options are being offered on all models, as are also a variety of trim options—three on the 40, four on the 60, six on the 80, and five on the 90.

On the Series 40 and 60 the wheelbases are 4 in. longer than last year, being now 122 and 126 in. respectively. Wheelbases of the 80 and 90 remain at 131 and 138 in.

Engines have been improved in detail to increase their performance and serviceability. In the 40 the stroke has been lengthened $\frac{1}{4}$ in., the new engine being a valve-in-head eight-cylinder inline of 3 3/32-in. bore and 4 1/8-in. stroke (248 cu. in. displacement). By increasing the displacement, adopting T-P streamlined intake valves and a new exhaust system, and by increasing the compression ratio from 5.65 to



Streamlined intake valve

5.70, the output has been stepped up 7 hp., the engine now having a rating of 100 hp. at 3200 r.p.m. The Series 60 engine, which is used on 60, 80 and 90 models, has been stepped up 10 hp. by the same means, except that its cylinder dimensions remain the same. This is a valve-in-head, eight-cylinder in-line engine of 3 7/16-in. bore by 4 5/16-in. stroke (320.2 cu. in.). Its compression ratio has been increased from 5.45 to 5.75.

Front end, sheet metal parts are assembled as a unit comprising the radiator and shell, splashes, and front fenders. The radiator shell is unusually deep and carries the long (Guide) headlamps practically as an integral unit. Because of this construction, the hood sides are shorter than the hood top, and to afford the necessary rigidity, Buick uses a special hood lock which engages at two points at the hood top and at one point at the frame. This affords good accessibility for engine service and fully exposes water and oil fillers on one side.

The radiator grille is now made in two separate sections with horizontal bars. These sections are fastened to the sheet-metal frame from the outside to facilitate repair or replacement. A sheet metal baffle running vertically down the center of the shell, on the inside, has been found to improve air circulation through the radiator.

The hypoid rear end has been adopted on the 40 and 60 only. It features a relatively small helix angle, thus reducing the amount of sliding contact and giving an increased factor of safety with commercial hypoid lubricants. Running boards are mounted separately from the body and fenders and may be electrically insulated from the frame to serve as radio antenna. Disc wheels are standard equipment on all models.

Engine Details

Engines of all models are mounted on rubber at five points, the rear mountings having been changed somewhat in detail. Oil filters have been eliminated on all models and in their

enters the 1937 season with two new series of models. All-steel bodies and hypoid gears are featured

place Buick now uses a floating oil-pump screen, which is arranged to float near the top of the oil sump, so that any sludge or dirt in the oil is less likely to get into the circulating system.

A new Stromberg double-float carburetor of the dual down-draft type has been adopted to assure a positive feed regardless of the effects of acceleration, steep grades, or fast cornering. A new automatic choke is used, which is fastened directly to the carburetor and operates the choke valve by means of a flexible shaft encased in a rubber boot. The choke control has a two-point adjustment for fuel volatility.

Aluminum-alloy, anodized pistons are continued, with a "heat deflection" groove above the top ring. Rings are 1/32 in. wider and have a 0.0005-in.-tapered face for quick seating. Pistons have T-slotted, cam ground skirts.

The Series 40 now has a radiator core that is 2 in. thick and has a frontal area of 425 sq. in. (as compared with 402 sq. in. last year). Water pumps of all models are provided with a double

chevron packing with a duPrene annular ring in between to assure a good seal. The pump carries a substantial oil reservoir feeding to the packing.

To assure better winter operation, the cooling system is provided with a by-pass valve of fixed-opening which permits alcohol mixtures to circulate freely without expansion after the engine stops. Water jackets now are sealed against leakage through cylinder-head bolts and bracket bolts by the simple expedient of using blind-tapped holes for all except one stud.

The special oil-temperature regulator for the valve mechanism, used last year on the 60-80-90, has been eliminated in favor of aluminum rocker shaft brackets so designed that they serve as a thermostat, which is said to control valve clearance more efficiently than the oil regulator.

Rocker arms have been redesigned to achieve better oil control. Main and connecting rod bearings are of a high lead alloy. Main bearings have thin steel backs, while the bearing metal is spun in on the connecting rods.

A new free exhaust system, with a larger tail pipe and a straight-through, resonance-type muffler, designed by Buick, has aided largely in improving performance. The same muffler is interchangeable on all models.

Spark plugs are 18 mm. A-C type H-9. Generators are Delco-Remy, compensated third brush type rated at 35 amp. capacity, which is considered ample for modern demands on the electrical system. Voltage regulation is standard on all models. Lighting equipment comprises shell-mounted headlamps, fender-mounted parking lights, and twin stop and tail lamps with re-

Buick Series 40
special coupe with
fender - well equipment



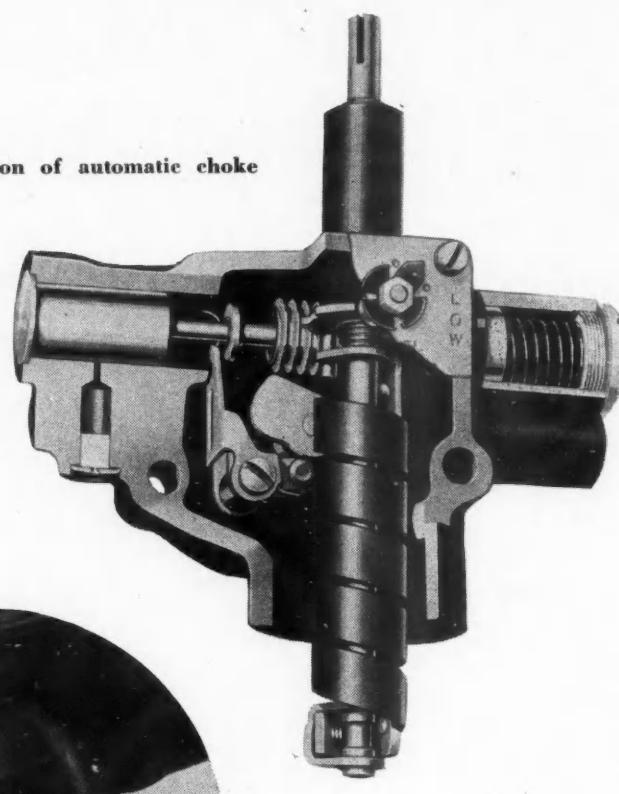
flecting area and intensifying lens. In addition, all sedan and convertible jobs with trunk or luggage compartment have the license plate mounting on the rear panel in the center, with a special lamp for illumination.

Chassis Details

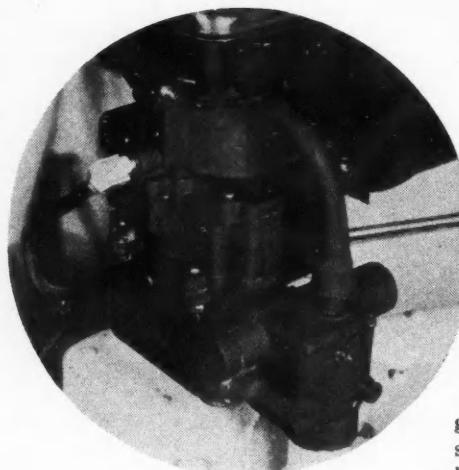
Series 40 and 60 frames feature a welded I-beam-section X-frame member which increases the torsional rigidity over 100 per cent. The new frames have curved side rails which follow the body contour, thus eliminating body brackets. While the front suspension remains the same fundamentally it has many detail changes. On the 40 and 60 there is a new control arm forging of I-beam section; and threaded bushings are now used at all points. On the 80 and 90, the construction is the same as before, except that the lower arm forging is of I-beam section and the two arm forgings are joined by welding into an integral unit. Upper arms are new and bolted together at the knuckle to form an integral unit.

Riding qualities and steering are greatly improved by the adoption of sway bars at both front and rear, equal weight distribution between front and rear, and double-acting shock absorbers at front and rear on all series. Center-point steering is continued, and the steering geometry remains the same on the Series 80 and 90. On the Series 40 and 60 the pitman arm now has a transverse motion, which eliminates the ball crank, and the lever to which the tie rods are connected now serves simply as a transfer arm.

Cross section of automatic choke



Improved automatic choke mounted on carburetor



A new straddle-mounted steering gear with double-tooth roller and double spring mounting for the pitman arm ball has been adopted. The biggest change in steering geometry on all models is the adoption of O-O-O adjustment for camber, caster and toe-in.

A semi-floating axle with two leather oil seals at each wheel is standard on all series. On the Series 90, the propeller-shaft diameter is reduced at the axle end and the shaft is supported by a bearing in the torque tube about 7 in. from the axle housing. This reduces the tendency to whip and permits the use of a lighter propeller shaft with more cushioning effect for transmission and driving gears.

The parking-brake hook-up has been improved by the use of a straight-pull cable directly to the junction of the brake rods at the rear of the X-member, the cable passing through the X-member directly below the torque tube.

The service brake system remains substantially the same as last year, except that the anchor pin location has been changed on the 60 and 80 so that the brake shoes will not be interchangeable with 1936 models. Shoes remain the same on the 40 and 90. All backing plates and shoes now are zinc-plated. In the Series 40 and 60, the

Buick Body Models—1937

Special 40 Series

- 5 Pass. Two Door Sedan, Plain Back
- 5 Pass. Two Door Sedan, Trunk Back
- 5 Pass. Four Door Sedan, Plain Back
- 5 Pass. Four Door Sedan, Trunk Back
- 2 Pass. Business Coupe
- 4 Pass. Sport Coupe, Opera Seats
- 4 Pass. Convertible Coupe, Rumble Seat
- 5 Pass. Convertible Phaeton, Plain Back

Century 60 Series

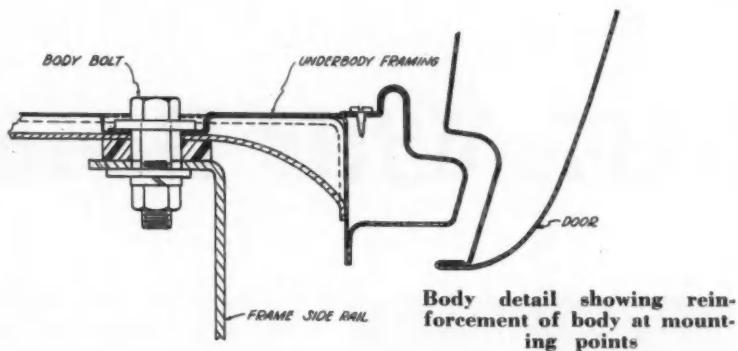
- 5 Pass. Two Door Sedan, Plain Back
- 5 Pass. Two Door Sedan, Trunk Back
- 5 Pass. Four Door Sedan, Plain Back

Limited 90 Series

- 8 Pass. Four Door Sedan, Trunk Back, Fender Well Only
- 8 Pass. Limousine, Trunk Back, Fender Well Only
- 6 Pass. Four Door Sedan, Trunk Back, Fender Well Only
- 6 Pass. Four Door, Formal Sedan, Trunk Back, Fender Well Only

Roadmaster 80 Series

- 6 Pass. Four Door Phaeton, Trunk Back, Fender Well Only
- 6 Pass. Four Door Sedan, Trunk Back
- 6 Pass. Four Door Formal Sedan, Trunk Back



master cylinder is accessible for service through a cover plate provided in the floor.

Detail improvements have been made in transmissions. On the 40, second-speed engagement has been improved by an increase in the angle of second speed drum cam; detent springs are wider and thicker, and the tooth-end pointing now conforms to the slope of the helix angle of the teeth.

The Series 40 clutch, made by Long, has been increased to 10 in. diameter to take care of increased engine power. On the other three models the 11-in. size is retained, as it had sufficient capacity to take care of the increased horse power. However, the disc is thinner and lightened by perforations, to reduce the revolving mass and thus improve shifting of the transmission gears.

Body Details

Bodies for the 40 and 60 series are composed of the usual steel outer panels reinforced by a framework of steel stampings within, the whole being made a unit structure by welding. Body sills and pillars are box sections. The internal steel panels are ribbed for greater strength and metal is removed

wherever possible without sacrificing strength, to reduce weight.

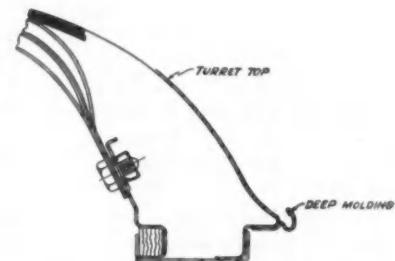
The outstanding feature of the bodies is the increase in available space for both passengers and luggage. The maximum body width has been increased 2 $\frac{1}{2}$ in. over the 1936 40-60 body, while the seat width is 3 in. greater in front and 1 $\frac{1}{2}$ in. in the rear. While the overall height of the car has been reduced more than an inch, the floor level has been lowered more than 2 in. so that there is greater head room inside the body and the door openings are higher. The volume of the luggage compartment has been materially increased. Another feature of the Series 40 and 60 is the addition of plain back models to both the four- and two-door sedans. These models have a rear section which sweeps down gracefully in an unbroken line from the top to the bottom of the body. This construction not only provides space for the spare tire but also makes available a larger volume for luggage than the 1936 models with the trunk back.

Convertible coupes are now available with five wheel equipment in addition to the fender-well jobs, the extra wheel being carried in a separate compartment below the rumble seat and reached

through a separate door below the rear deck lid. Entirely new instrument panels are featured on all 1937 models, with instruments so arranged as to be easily and quickly read.

Body insulation is in keeping with former practice. Floors front and rear are covered with a sheet of $\frac{1}{4}$ in. Celotex and $\frac{1}{2}$ in. jute pads. All side panels and ceiling are coated with a sheet of black insulating paper; the rear trunk compartment is treated with the same material. The dash has an insulated dam 1 $\frac{5}{16}$ in. thick composed of Celotex board and jute padding, covered with embossed finishing board. On the 80 and 90 the use of a hair-felt blanket for thermal and acoustic insulation is continued.

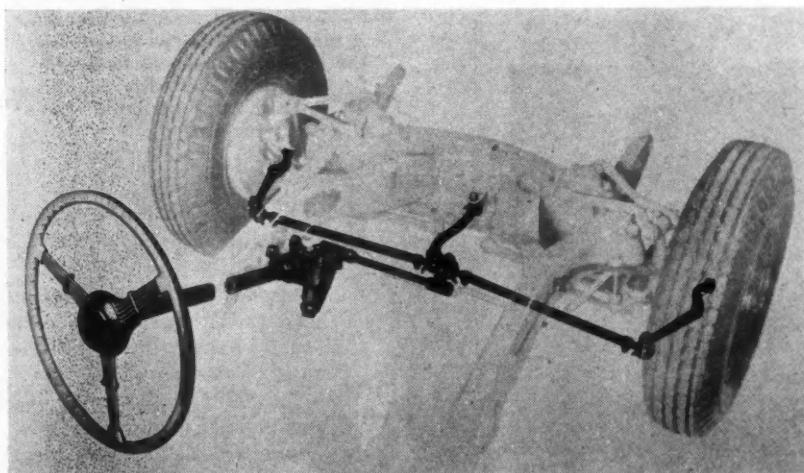
A new rear-quarter ventilator is used on 40-60 Series four-door sedans. In this design the entire window is hinged on vertical pivots near its forward edge and swings outward at the rear. Sufficient friction is provided in the pivots to hold the window in whatever position it is set, and it is locked by means of a simple T-handle.



Body detail, showing a cross section at the roof rail of 40 and 60 bodies

Doors are more effectively sealed by the use of two separate weather strips. The former wind hose is retained on the inner side of the door but its diameter has been increased to $\frac{1}{2}$ in., in order to adequately seal the largest possible gap between door and body. In addition, a new rubber weather strip, similar to the seal used on refrigerator doors, has been added at the inner edge of the door flange. When the door is closed, this rubber seal is tightly compressed against the outer door channels.

A new seat adjustment has been designed to raise the seat $\frac{1}{4}$ in. in 4 in. of forward travel. This is claimed to provide correct seating for persons of all statures. In addition to this combination of movements, the seat angle is changed with fore-and-aft adjustment, so that the seat back is more nearly vertical at the forward setting and somewhat tilted backwards when at the rear setting.



New steering linkage of 1937 Buicks

Dodge for '37 With Roomier

NEW all-steel bodies with steel roof and underbody, wider and roomier than last year; hypoid rear axles to eliminate objectionable tunneling, and many refinements resulting in improved performance and riding quality—these are the high spots of the Dodge line for 1937.

Shunt-wound generators with vibrator voltage control are now fitted. Three de luxe packages are offered for those who desire special equipment, and the radio and heater also remain extras.

The Dodge standard line, which is mounted on a chassis of 115-in. wheel-base, comprises the following body types: Two- and four-door sedans, two- and four-door touring sedan, business and rumble-seat coupes, convertible coupe, and sedan. Sedans have luggage compartments accessible through rear-deck doors, while the touring sedans have a built-in trunk compartment. Dodge will also offer a seven-passenger touring sedan and a seven-passenger limousine on a chassis of 132-in. wheel-base.

The radiator front end has been moved forward several inches and the engine 1 in. Front and rear seats are 3 in. farther forward with respect to the rear axle.

Characteristic lines of last year are retained, but modifications have been made in the front end and in the sweep of the rear body panel. The radiator grille now is in three sections, all steel stampings, with the two side sections mounted in die-cast zinc frames. Fend-



Anti-sway bar and direct-acting shock absorber at front end of car

the upholstery; the windshield regulator is now completely encased like a folding tape measure; all instrument-panel control buttons are made flush and must be pulled out for use. In addition, the upper roll of the front seat back is padded with sponge rubber to eliminate the usual hard areas.

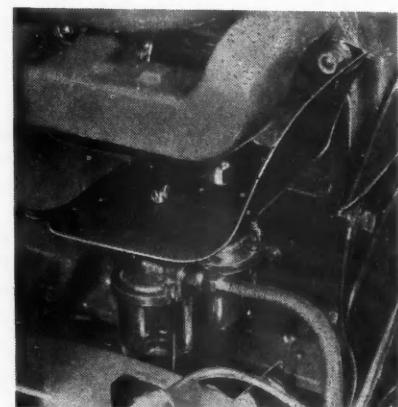
The chief mechanical details remain the same so far as specifications are concerned but incorporate many detail refinements.

Engine Details

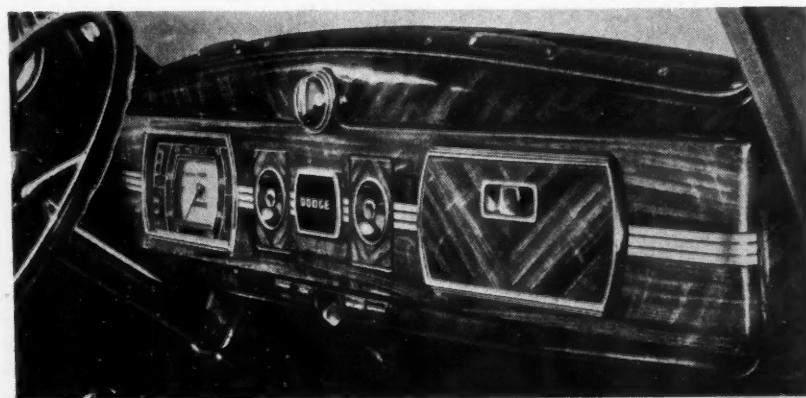
The engine remains a six-cylinder L-head design with a bore of $3\frac{1}{4}$ in. and a stroke of $4\frac{1}{8}$ in. (217.8 cu. in.); it is rated 87 hp. at 3600 r.p.m. with cast iron head and a compression ratio of 6.5. The well-known "floating-power" suspension is continued. The carburetor is a $1\frac{1}{4}$ -in. plain-tube Strom-

ers are new, the front fenders being deeper, without reverse curves at the rear, and without the cat-walk. Headlamps are shell-mounted, and the horn is encased within the space between the grille and radiator core.

Having incorporated safety features in the running gear, Dodge has developed a new safety treatment for the body inside and out, carrying it into some of the finer details. Thus both outside and inside door handles curve in to the door panel; the window regulators are brought in almost flush with



A metal shield keeps heat from the exhaust manifold from the fuel pump and directs the blast from the radiator fan toward it



On the instrument panel all knobs, switches and handles are sunk in recesses

berg, and an automatic choke and fast idle are provided.

Connecting-rod and main bearings (of which latter there are four) are of the steel-back, babbitt-lined precision type. Pistons remain the same, that is, they are of aluminum alloy with steel strut and split skirt.

Spark plugs are 14 mm. A larger Purolator oil filter, described as a four-element filter, is now used. It will re-

Bodies Is Engineered for Safety

quire less frequent filter element changes. The fuel line has been stepped up from $\frac{1}{4}$ to $5/16$ in. in diameter, which in combination with outside mounting, keeps down the vapor-locking tendency. As a further help to this end, the fuel pump has a baffle plate to deflect heat from the exhaust manifold, and a new vent in the engine side splasher permits underhood heat to escape under the car.

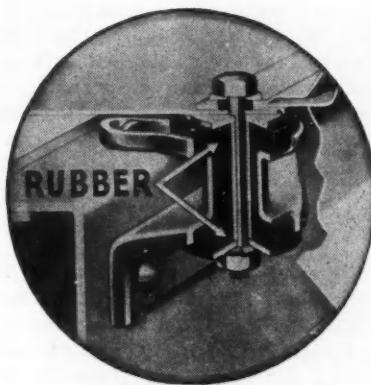
Chassis Details

Many important refinements are incorporated in the chassis. The frame has been stiffened by additional cross members and by heavier boxing at the X-member center section. The body is completely supported on rubber, being mounted on outrigger brackets containing rubber spools. Five spools are located on each side rail, two on the rear cross member. In addition, there are two rubber biscuits at each kick-up.



License-plate mounting on the new Dodge

Dodge two-door touring sedan equipped for riding ease. The touring trunk, an integral part of the mounted steel body, holds the spare wheel as well as the travelers' luggage.



Sectional view of body mounting bracket with rubber bushing and washers

Direct-acting shock absorbers are used at both front and rear. The anti-sway bar has a new rubber mounting on top of the frame cross member and is connected to the axle by a linkage independent of the shock absorbers. The spring suspension remains the same, but the spring rates have been lowered all around, depending on the body type.

A roller is now provided on the second-to-high shift rail, which reduces the effort required to make the gear change. Road "feel" through the steering gear has been improved by decreasing the gear ratio from 18.2 to 16.4. In addition, the drag link and tie-rod joints now are encased in leather boots to

keep out water and dirt and improve lubrication.

Much effort has been spent on chassis-lubrication features. For example, the clutch-release bearing is of the ball-thrust type, with an Oilite pilot bearing, and with sealed-in lubricant, so that no further lubrication service is required. The plug for lubricating universal joints has been removed, as these will not require attention for over 30,000 miles. On the new hypoid rear axles, the usual grease fitting at the wheel bearings has been replaced by pipe plugs and should require lubrication only every 12,000 miles.

Low-pressure tires and steel-disc wheels are standard. Tires are four-ply, 6.00-16, and the inflation pressure recommended is 28 lb. per sq. in.

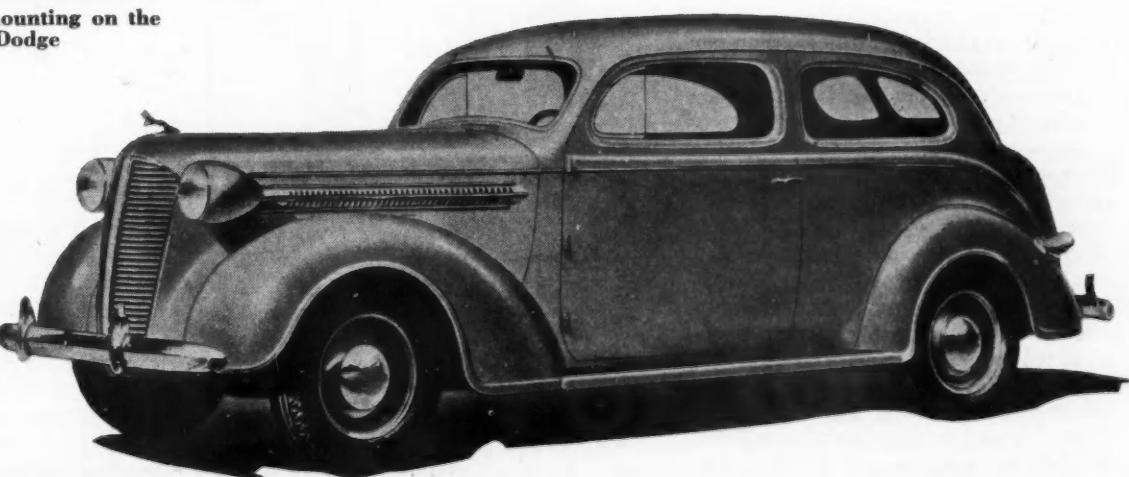
Electrical System

The new voltage-controlled generator has a capacity of 22 amps. at speeds above 20 m.p.h. Both speed and intake-manifold pressure automatically time the ignition. A 15-plate Willard battery is standard equipment and is rated 95 amp.-hrs. Headlamps have 32-32 two-filament bulbs, and for passing the beams are shifted toward the right and down by means of a foot switch. A combination tail and stop light is used. The license plate is now located on the rear panel.

Body Details

Bodies are wider, roomier, and of all-steel construction, with steel top. The

(Turn to page 527, please)



Allis-Chalmers Develops

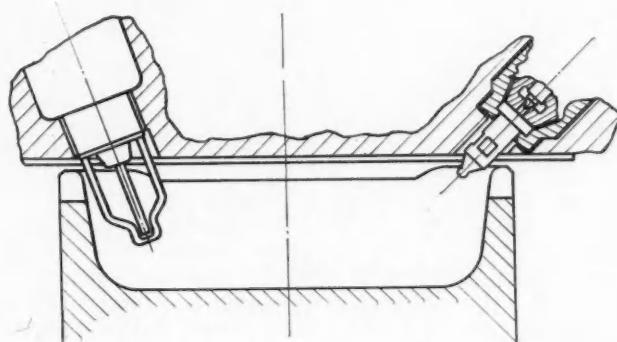
A NEW fuel-injection spark-ignition engine developed by the Allis-Chalmers Manufacturing Co. for use in its crawler-type tractors and as a stationary power unit was described in a paper read by Nicholas Fodor before the Oil and Gas Power Division of the A.S.M.E. at Ann Arbor, Mich., recently. This development was undertaken, Mr. Fodor said, because there was a demand for engines burning a cheaper fuel than gasoline and it was found that torque fluctuations of Diesel engines were so great that the transmission of the crawler-type tractors was unable to withstand the impulses without redesigning and

ignite at once; on the contrary, combustion takes place gradually, and the maximum pressure is reached between 15 and 18 deg. past top center, with the engine operating at the rated load and speed. At part load injection begins somewhat later, but the spark is fixed and the rate of combustion is controlled by the timing of the fuel injection.

At full load the total quantity of air admitted to the engine is used for combustion, the air/fuel ratio being of the order of 15/1 to 16/1. At part load the quantity of air admitted is reduced by means of a simple butterfly valve placed between the air cleaner

and the inlet manifold and controlled by a conventional governor. The quantity of fuel injected is controlled by a vacuum governor and the air/fuel ratio is kept substantially constant.

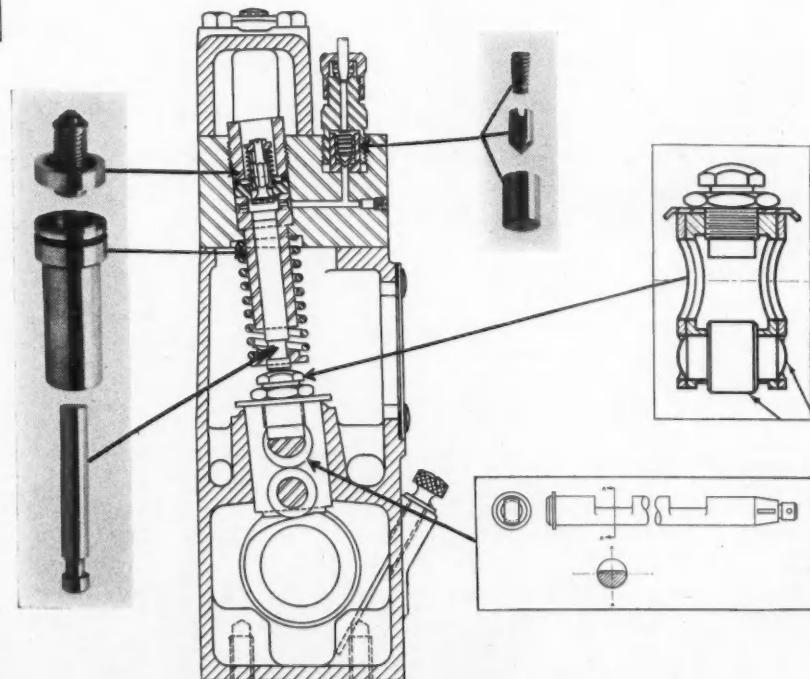
The engine has a bore of $5\frac{1}{4}$ and a stroke of $6\frac{1}{2}$ in. Its normal speed is 1050 r.p.m. and its maximum governed speed, 1200 r.p.m. The combustion chamber is contained in the cup-shaped piston, and the under side of the cylinder head is flat. The pistons are of cast iron, tin-plated, and carry three $\frac{3}{16}$ -in. compression rings and one $\frac{1}{4}$ -in. oil ring. The replaceable cylinder liners are made of nickel cast iron of the customary hardness, and the same liners are used in the carburetor and fuel-injection engines. The valves in the cylinder head are so arranged that the air enters the cylinder tangentially, so that a certain amount of turbulence is set up. Both the inlet and the exhaust passages are laid out with a view to minimum resistance to flow. Large water passages are provided over the combustion chamber and around the



Combustion-chamber form of engine

materially strengthening it. Another consideration was that the company is a large producer of gasoline-engined tractors, and the splitting of the production line into separate sections for gasoline-engined and Diesel-engined tractors would have been undesirable.

The new Allis-Chalmers engine operates on the four-stroke principle. Only air is admitted to the cylinders during the suction stroke, and this air is then compressed in the ratio of 6.4 to 1, to about 160 lb. per sq. in. pressure. About 50 deg. before the top center is reached at the end of the compression stroke, fuel injection begins, fuel being injected into the cylinders in finely atomized form. Injection continues until 10 deg. before top dead center. The spark occurs 12 deg. ahead of dead center. Owing to the time required for the fuel to vaporize, not all of it will



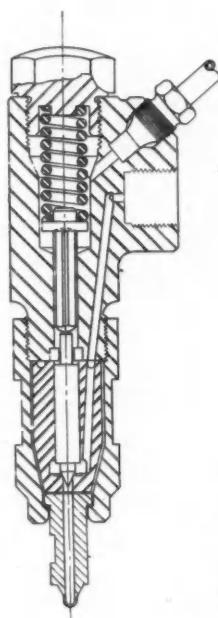
Sectional view and details of Deco fuel-injection pump

Spark Ignition Oil Engine

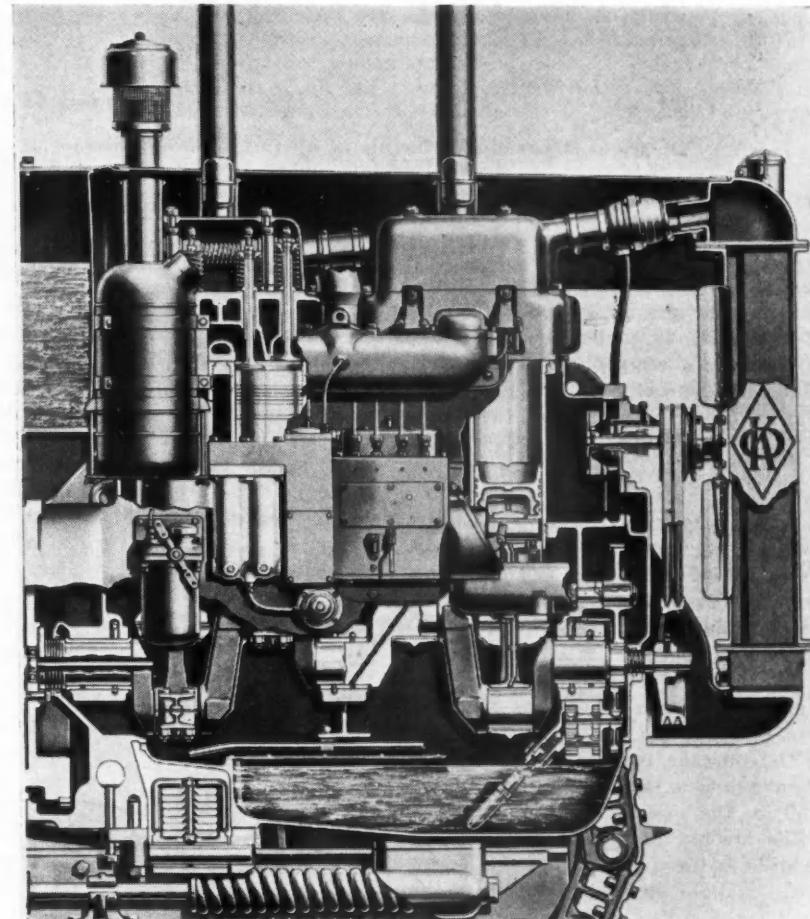
valves. Valves, valve gearing, crank-shaft, connecting rods and bearings are identical with those of the gasoline engine, and both engines are built on the same assembly line.

The fuel pump employed is known as the Deco and is manufactured by the Diesel Equipment Corporation. It has three main structural parts, the housing, body and suction-valve cover. The cast-iron housing has its top surface machined, for a perfect fit to the body. There is an individual pump unit for each cylinder. Each unit consists of a suction valve, plunger and barrel, discharge and tappet assembly. The barrel fits securely in the body, and directly above it is the suction-valve body. The lower portion of the valve

Deco injector in section



body is accurately ground as a valve seat, and the upper portion acts as a guide for the suction valve. A small spring insures a quick closure of the valves when the suction force is released. Several small holes drilled in the suction-valve body, just above the seat, permit fuel to pass from the manifold to the valves. The entire valve assembly is held in position by



Cut-away view of Allis-Chalmers spark-ignition oil engine

sleeve nuts screwed into the pump head.

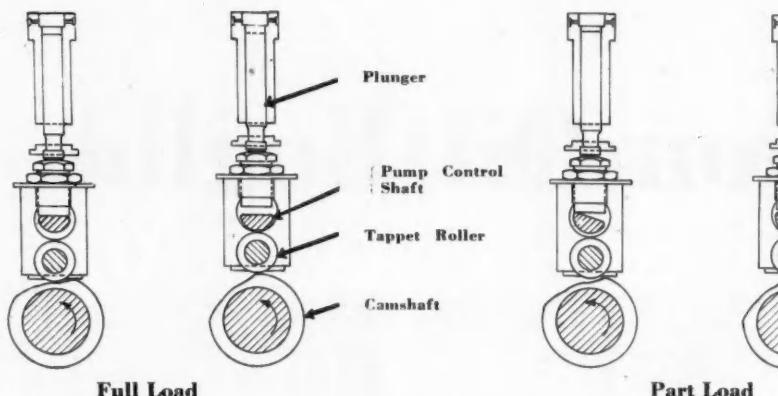
The steel plunger and barrel, which are located directly beneath the suction-valve assembly, are accurately ground. The lower end of the plunger is in contact with the tappet-adjusting screw located in the upper end of the tappet-body assembly. The lower end of the tappet assembly is provided with a roller which engages the camshaft, and the entire tappet assembly is installed with a sliding fit in the pump housing and rests on the flat cross-section of the control rod. It is held in place by the heavy plunger spring.

The control rod, which extends the entire length of the pump housing, passes through all of the tappet bodies between the rollers and tappet screws.

The section of the control rod within the tappet bodies is machined flat, and by its rotation the stroke and, therefore, the amount of the fuel handled by the pump, is controlled.

The pump camshaft, running in a bath of oil, is supported on roller bearings with suitable oil seals, and mounted in a chamber which is entirely sealed from the rest of the housing except for a small air vent. In this design fuel oil which may collect in the upper portion of the housing cannot enter the camshaft chamber and dilute the lubricating oil. A drain is provided for any fuel oil that may collect in the upper portion of the housing.

In front of the suction-valve cover, and located in the body proper, is a discharge valve, consisting of the valve,



Diagrams illustrating principle of operation of variable-stroke injection pump

barrel, and spring. The valve is drilled to accommodate the spring. The tip of the valve is conical in shape and fits into the lower portion of the barrel, which is accurately ground to a valve seat. The upper portion of the barrel serves as a guide for the valve. Holes are drilled in the conical tip of the valve just above the valve seat, and flats are machined along the entire length of the outside of the valve body. By means of these holes and flats, fuel can flow unhindered through the injector tubing and to the injector when the valve is opened.

The flow of fuel into the combustion chamber continues as long as the pressure remains above 1350 lb. As soon as the plunger reaches the end of its upward stroke, the pressure falls below 1350 lb. and injection ceases.

The amount of fuel injected by the pump is metered by varying the length of the plunger stroke. Rotation of the control rod a few degrees causes the high edge of the control rod to act on the adjusting screw and thus raise the entire tappet assembly. The effect of this movement is to decrease the stroke of the plunger, because the roller will be raised and, therefore, will be contacted by the cam at a higher point on the cam. By rotating the control rod to the maximum, the roller in the tappet assembly may be raised so that it will never be contacted by the cam. In this position the pump becomes ineffective, which serves to stop the injection.

The second part of the injection system is the injector. It contains a spring-loaded-nozzle valve that regulates the injection pressure and is operated hydraulically by the fuel pump. The part of the injector which enters the combustion chamber is called the tip. The design of the tip determines the shape of the fuel spray, its power of penetration, and the degree in which it is broken up into a fine mist.

A conventional diaphragm pump

driven off the fuel-pump camshaft supplies the injection pump with fuel from the tank. This primary pump forces the fuel through a filter before it can enter the injection pump. A pre-filter installed in the fuel tank removes large particles from the fuel.

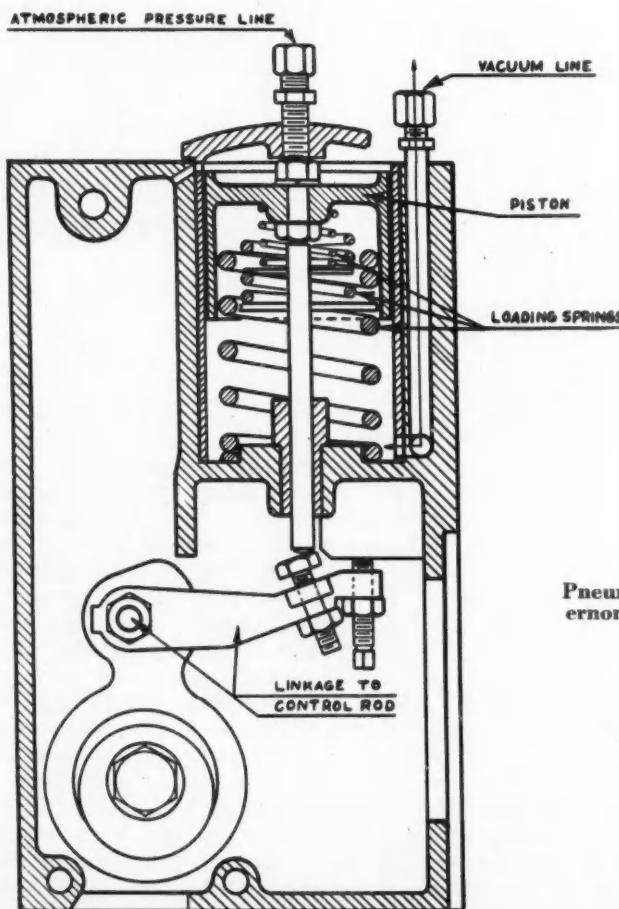
The engine is throttled and governed by means of a vacuum control which is mounted on one end of the fuel-injection pump and has a vertical spring-loaded piston within a cylinder which,

by means of suitable linkage, turns the pump control-rod in the fuel pump.

The vacuum control cylinder is air tight except for two outlets, one on each side of the piston. The outlet on the spring-loaded side of the piston is piped to the vacuum side of the butterfly valve in the intake manifold. The other outlet connects to the pressure side of this valve. Any increase in the manifold vacuum will move the piston downward against the spring tension, and any decrease in the manifold vacuum will allow the spring to move the piston upward. The movement of this piston is transferred to the control-rod in the pump and causes it to rotate, thus increasing or decreasing the length of the pump plunger in accordance with the manifold vacuum.

The oil engine requires a hotter spark than the gasoline engine, and it was found that the conventional magneto did not give satisfactory service, not having enough reserve capacity for emergencies. The magneto used for oil engines has a rotor of either cobalt steel or alnico steel, but is otherwise identical with the conventional type. Similar changes had to be made in the battery ignition system to obtain a hotter spark, and today both magnetos

(Turn to page 528, please)



Pneumatic governor in section



AUTOMOTIVE ABSTRACTS

New Rating for Anti-Detonating Quality

A NEW scale for anti-detonating quality of fuels for carburetor engines has been developed by Max Serruys and was described by him in *Le Genie Civil*.

The author raises the objection to the octane-number system that, even though it permits calculation of the limiting induction pressure or the limiting compression ratio permissible with a given fuel and a definite engine, these factors alone are not sufficient to define the real combustion qualities of the fuel under consideration. It is obvious that the practical performance obtainable, that is, the horse power and the specific consumption, are not solely dependent on the induction pressure and the compression ratio, but also on certain characteristics of the fuel, such as the calorific power, the ratio of chemical combination of the fuel, the volatility, the density, etc.

Starting with these theoretical considerations the author developed the following new method for rating carburetor fuels. It furnishes what is called the synthetic index, a factor which is directly representative of the performance which may be expected from the fuel. This method consists in comparing the effective powers obtained in one and the same engine with the fuel under test and with a reference fuel. For reference fuel the author suggests a pure compound or a mixture of pure compounds, such as octane and

heptane. The manifold pressure is so regulated that there is incipient detonation. Quite naturally, every precaution is taken to prevent variation of other factors which might influence the operation of the engine (temperature and humidity of the air, temperatures of oil and water, ignition advance, etc.), and the carburetor in all cases is adjusted to give the same per cent of oxygen in the exhaust gas. The ratio of the two power outputs measured, multiplied by 100, is the synthetic index of the fuel studied. This method takes account of all the characteristics of the fuel which may influence the practical performance of the engine.—*Le Genie Civil*, March 21.

M.

RICHARD, a French engineer, is developing a new type of internal combustion engine of unusually small projected area. It is a single-cylinder two-stroke engine and makes use of the Cadenacy effect whereby scavenging is effected by a vacuum created by the exhaust. As regards the general construction, the engine consists of a tubular structure turning around its longitudinal axis and carrying the propeller hub at one end. It has a single cylinder in which there are two pistons moving in opposite directions at any given time and connected to two crankshafts. Each crankshaft carries a bevel pinion at one end, and these bevel pinions mesh with a stationary bevel gear, and the rolling motion of the bevel pinions on the stationary bevel gear causes the whole engine to rotate. A single-cylinder engine of this type, with a bore of 2.90 in. and a stroke of 2 x 2.56 in., is said to develop 20 hp. at 4000 r.p.m. (with the propeller turning at 1400 r.p.m.). The projected arc of the engine is only 7.1 in. in diameter, and the engine is said to be very promising for light planes for the amateur aviator.—*La Technique Moderne*, June 15.

New Rotary Engine

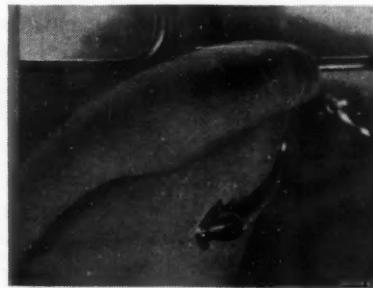
Dodge for '37 with Roomier Bodies Is Engineered for Safety

(Continued from page 523)

new body is 3 in. wider at the cowl and front seat, and 50 in. clear from floor to roof. The rear seat width has been increased by 2½ in. Front doors are hinged at the front pillar and all wide-door models have three hinges.

After a long absence, the drip molding again becomes an integral feature of the body, and will contribute its share to comfort in wet weather. The windshield is a one-piece glass, affording full clear vision. The front ventilator pane now is pivoted on friction bearings, the rear-quarter ventilator remaining the same as before. The rear window clears the wheel house sufficiently to permit the window glass to go all the way down.

Two defroster louvers at the top of the instrument board are connected to a



Safety roll of sponge rubber at back of front seat

manifold and can be attached to the car heater whenever one is installed.

The new instrument board has the safety control buttons and, in addition,

the lower edge has been raised, for the sake of safety.

Body insulation has been improved to give better thermal and acoustic control with the all-steel construction. The steel roof has cemented to it a blanket consisting of two outer layers of treated paper with a wadding material in between. This blanket is said to have superior sound-absorbing qualities. The same blanket is cemented to the cowl side panels. A special asphaltic-treated composition is cemented to the floor panels and the trunk floor. Insulation is used also on side and door panels and under the blanket on the roof panel. The trunk lid is sprayed with a gum-like substance and asphaltic material, for sound-deadening.—P. M. H. and J. G.

New York Show Exhibitors

(Continued from page 504)

Continental Motors Corp., 12801 E. Jefferson Ave., Detroit	C-8 to 12	Herron-Zimmers Moulding Co., 3650 Beaufait St., Detroit	D-10
Clayton Mfg. Co., 501 S. Marengo St., Alhambra, Calif.	C-50	Hollingshead, R. M., Corp. 840 Cooper St., Camden, N. J.	D-79-81
Clayton-Steele Production Co., Inc., 60 E. 42nd St., N. Y.	C-42	Kendall Refining Co., Bradford, Pa.	C-57-58
Diesel Publications, Inc., 192 Lexington Ave., N. Y.	C-61	Magnalite Sales Corp., 30 Rockefeller Plaza, N. Y.	C-62
Electro-Chemical Engraving Co., Inc., 1100 Brook Ave., N. Y.	C-20	Martin Custom Made Tire Corp., 645 11th Ave., New York	D-24
Encyclopedia Britannica, Inc., 342 Madison Ave., N. Y.	D-26	MoToR, 572 Madison Avenue, New York	D-27
Evans Products Co., Union Guardian Bldg., Detroit	C-47-48-49	Nacto Cleaner Corp., 2171 Madison Ave., New York	C-19
Fisher Body Co., Detroit	B-5	Overhead Door Corp., Hartford City Ind.	D-12
Hemphill Diesel Schools, 31-28 Queens Blvd., L. I. City, N. Y.	C-60	Permutit Co., 330 W. 42nd St., New York	C-66
Mercules Motor Corp., Canton, O.	C-2 to 7	Pines Waterfront Co., 1135 N. Cicero Ave., Chicago, Ill.	C-39-40

Simoniz Co., 181 West End Ave., New York	C-18
Stewart-Warner Corp., 1826 Diversey Parkway, Chicago	C-16
Tennessee Eastman Corp., Kingsport, Tenn.	C-23
Titeflex Metal Hose Co., 500 Frelinghuysen Ave., Newark, N. J.	C-55
Trailer Travel Magazine, K. H. Dixon & Co., 35 E. Wacker Drive, Chicago	D-8
Trans-Lever Spring Corp., 2109 Penobscot Bldg., Detroit	C-54
United American Bosch Corp., Springfield, Mass.	C-43-44
U. S. Air Compressor Co., 5300 Harvard Ave., Cleveland, O.	C-24-25
Universal Carloading & Distributing Co., 40 Rector St., New York	C-27
Joseph Weidenhoff, Inc., 4344 Roosevelt Road, Chicago	C-32-33-34
Yale & Towne Mfg. Co., 12340 Cleveland Ave., Detroit	C-26
York Automotive Distributing Co., Inc., 17 W. 60th St., New York	D-29
Young Windows of America, 570-7th Ave., N. Y.	C-63
Zenith Radio Corp., c/o Colen-Gruhn Co., Inc., 387 4th Ave., New York	D-9

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